pH-ORP

Product Name	Part No.
7773/7773D Flow & Immersion Mounting,	70-82-03-03
7774/7774D Insertion Removal Mounting	70-82-03-06
7777DVP Immersion/In-Line Mounting	70-82-03-51
7777/7777D Immersion/In-Line Mounting	70-82-03-05
7794DVP Sanitary Durafet III Mounting	70-82-03-53
HB Series Ruggedized Electrodes	70-82-03-55
	70-82-03-56
	70-82-03-57
Transmitter - APT2000PH	70-82-03-32
Analyzer - APT4000PH	70-82-03-44
DirectLine DL421/422 pH/ORP Transmitter	70-82-03-40
DirectLine DL2000 pH Mountings	70-82-03-59
Durafet non-Glass pH Sensor	70-82-03-50
HPW7000 HiPurity pH Measurement System	70-82-03-28
TL1000 Durafet II Twist Lock Mounting	70-82-03-43
Analyzer - UDA2182 Multiple Input	70-82-03-54
Durafet Cap Adapter Cables	70-82-03-66

Product Summary

pH-ORP

Improved accuracy to optimize your process

pH and ORP are measured throughout the process industries to ensure product quality, monitor effluent discharge, and control the addition of chemicals for optimal reactions. Applications include process, wastewater, and pure water measurements.

Honeywell's patented Durafet® non-glass probes and traditional glass pH technology help users measure, analyze and transmit pH and ORP information in the most demanding processes. We provide a complete line of analyzers and transmitters, along with different mounting configurations to provide the sensor interface to the process.

Series 7773 Flow/Immersion Mountings
Encompass the industrial measurement of pH, ORP and temperature in a flow or submersion configuration. 7773 is available with the widest available electrode, preamplifier, automatic temperature compensator and mounting assembly options.

Series 7774 Insertion/Removal Assembly
Accommodates Durafet II and Meredian Series combination (single-probe) pH or ORP electrodes. Designed for use in processes under pressure; the electrode can be inserted or removed without interrupting the process.

Series 7777 Electrode Mounting
Enables users to interface Durafet II pH electrodes with the process via a ¾" threaded connection, or Durafet III and Meredian II electrodes by either submersing the electrode or mounting it into a ¾" threaded connection.

7794DVP Sanitary Durafet III Mounting
This industry proven pH electrode, with over 14 years of Food and Beverage application experience, provides fast, accurate and dependable pH measurement in the most demanding applications.

HB Series Electrode Mounting
Designed for high-temperature, high-pressure and harsh chemical applications.

APT2000 pH/ORP Transmitter
Continuously monitors sensor and analyzer electronics and immediately displays diagnostic information at the onset of a problem.

APT4000 pH/ORP Analyzer
Continuously measures pH or ORP in industrial processes, including chemical, pharmaceutical, petrochemical, pulp & paper, and wastewater.

DirectLine DL421/422 pH/ORP Transmitter
Next generation of analytical transmitters. Its unique architecture combines the latest microelectronics with the proven performance of Honeywell's sensing technologies. Enables significant cost savings during installation, startup, operation and maintenance.

DirectLine DL2000 pH Mountings
Enables users to interface to the process by either immersing the electrode or mounting it into a ¾" threaded connection.

Durafet Non-glass pH Sensor
Industrial, non-glass, unbreakable, Ion Sensitive Field Effect Transistor (ISFET)-based pH sensor defines the state-of-the-art in pH measurement.

HPW7000 HiPurity pH Measurement System
Superior accuracy, stability and simplicity make this electrode mounting assembly well suited for measuring pH in high-purity water applications.

TL1000 Durafet II Twist Lock Mounting
Provides an easy way to install or remove Durafet II pH electrodes from pipelines and tees. A quick ¼ turn is all that is required for installation/removal.

UDA2182 Multiple Input Analyzer
The latest advancement in analyzer technology. This is the most versatile multiple input analyzer package on the market for measurement of pH, ORP, conductivity and dissolved oxygen.

Durafet Cap Adapter Cables
Durafet Cap Adapters are preamplifiers that are built into cables that connect the Durafet pH sensor to the pH Instrument. The preamplifier conditions the pH signal and allows for greater distances between the pH sensor and the pH Instrument.

Honeywell

Multipurpose pH/ORP Electrode Mountings Series 7773 Specifications

70-82-03-03 November 2007

Introduction

The 7773 Mounting is available with the widest available electrode, preamplifier, automatic temperature compensator, and mounting assembly options. Capabilities include state-of-the-art ISFET technology with Honeywell Durafet II® electrode options. These truly solid state sensors feature exceptionally fast response and a low impedance signal right from the sensing element that is virtually unbreakable. An improved packaging design allows the Durafet II electrode to be used in a wide variety of process applications.

Description

Overall 7773 Mounting capabilities encompass the industrial measurements of pH, ORP, specific ion, and temperature in a flow or submersion configuration. Wetted material choices include 316 stainless steel, glass-fiber reinforced polypropylene or Ryton®, for use in corrosive solutions at pressures up to 1034 kPa (150 psig) and temperatures up to 130°C (266°F). The 7773 is available in seven configurations; change between flow - and submersion-type mounting requires substitution of only one part.

Features

- Durafet II Ion Sensitive Field Effect Transistor (ISFET) Electrode options
- Universal mounting — most parts interchangeable between flow and submersion configurations
- Widest range of electrode options
- Combined pH, ORP and temperature measurement options in one mounting with UDA2182 Analyzer
- Ultrasonic electrode cleaning options
- Corrosion-resistant polymer and 316 stainless steel housing with integral preamplifier

- FM approved for Class I, Div 1, Group A, B, C, D locations with APT Transmitter and barriers; suitable for Division 2 locations with UDA2182 analyzers
- NEMA 4X, IP65 watertight and corrosion-resistant flow, and NEMA 6, IP68 submersible ratings

Preamplifier

Housed within the 7773 Mounting, the preamplifier accepts input from electrodes and temperature compensator through a sealed connector and terminals. Preamplifier circuitry is hermetically sealed against moisture and electrically shielded by its metal enclosure. A unique guarded circuit protects the high impedance glass electrode input, providing a thousand-fold decrease in sensitivity to electrical leakage under the potentially dirty, humid conditions of actual usage. The amplified signal can be sent over ordinary unshielded wire in excess of 305 m (1000 ft.) to the Honeywell measuring instrument.

The Durafet II electrode cap adapter option provides quick disconnect at input and output.

Preamplifier systems have high immunity to ground loop noise and spurious RF signals. Grounded and ungrounded solutions can be measured. Lightning protection is included in all preamplifiers. This is important when the mounting will be in a location subject to frequent lightning activity. It provides substantial protection by dissipating moderately destructive surge currents through the electrodes but cannot prevent failure caused by very near strikes.

Electrode Cleaning

Unattended automatic fluid cleaning and calibration of electrodes used with Honeywell 9782 Analyzers can be provided.

A continuously operating ultrasonic cleaner is optional with the 7773 Mounting to reduce maintenance caused by fouling or coating of the electrodes and particulate matter. It is less effective with oily or other resilient coatings that tend to absorb ultrasonic energy.

The ultrasonic cleaner consists of a transducer that fits within the 7773 between the electrodes with an integral 9 m (30 ft.) cable that runs directly to the 120/240 Vac-powered, NEMA 4, wall-mounted generator. It may be specified in Table 1 as part of a new mounting or ordered as a retrofit kit with 316 stainless steel (Kit 31002466) wetted parts. Ultrasonic cleaning is not recommended for use with Durafet II II or antimony electrodes.

Wetted Materials

Polypropylene offers the advantage of a light weight, tough plastic with good chemical resistance at low cost. Polypropylene may be weakened by some organic solvents and chlorine but is recommended for all general-purpose applications.

Ryton (polyphenylene) provides excellent chemical resistance and higher temperature and pressure ratings than polypropylene at moderate cost. Ryton is somewhat brittle and does not tolerate rough handling.

316 Stainless steel offers ruggedness and the highest pressure ratings.

pH, ORP Electrodes and Temperature Compensators

Durafet II II combination and measuring electrodes use the new ISFET (Ion Sensitive Field Effect Transistor) sensing element with especially fast response. Durafet II II sensors produce a low impedance pH signal for outstanding reliability even at low temperatures and they experience no sodium error or ORP interference. The combination Durafet II II electrode incorporates a reference electrode with replaceable KCl gel fill for long life.

All Durafet II II electrodes include an integral automatic temperature compensator for conventional Nernst electrode compensation. Because compensation is performed in the preamplifier, no separate compensator is used and no temperature display can be provided at the measuring instrument.

Conventional pH measuring electrodes used with the 7773 mountings are useable over a wide pH range. These sensitive, rugged electrodes have quick disconnect cable connections. Glass membrane formulations are available for a variety of temperature ranges. The 7773 mounting and UDA2182 are compatible with most 1/2” dia. ion-selective electrodes.

Reference electrodes are filled with a KCl slurry or a long-lasting viscous KCl gel. The gel is recommended for general-purpose use, especially for applications involving severe contamination, temperature or pressure cycling, continuous high temperatures, and dry periods. The Ryton electrode is virtually unbreakable and has an easily replaced porous-plug junction of ceramic. The glass body reference electrode has the porous plug sealed into the tube and the cap and internal element are removable for maintenance.

Meredian® Combination Electrodes comprise a rugged, virtually unbreakable, chemically-resistant Ryton body with a sealed, non-refillable long-lasting gel-type KCl diffusion reference electrode and a central element with a pH glass membrane designed for durability. The unique geometry of the annular ceramic reference junction permits making accurate, continuous pH measurements in the presence of high solution currents.

Automatic temperature compensators correct for the measuring electrode temperature coefficient. With microprocessor-based instruments they can also correct for the change in ionization of pure water samples, providing solution temperature compensation to 25°C. Temperature compensation is not used in ORP systems.

Specifications

7773 Mounting Specifications							
Application	Flow service in moderately pressurized lines or atmospheric discharge*		Flow service in High-pressure lines**		Submersion service in open tanks or process vessels. Submersion depth: up to 61 m (200 ft.) with preamplifier; up to 3m (10 ft.) without preamplifier		
Materials: Cover, Connecting Ring, Flow Chamber and Guard	Polypro-pylene	Ryton	316 SS	316 SS, with Polypro-pylene Cover**	Polypro-pylene	316 SS	Ryton
Maximum Pressure and Temperature of Assembly only	689 kPa (100 psig), 60°C (140°F); 345 kPa (50 psig) 80°C (176°F)	515 kPa (75 psig), 80°C (176°F); 345 kPa (50 psig), 100°C (212°F)	1034 kPa (150 psig), 80°C (176°F); 552 kPa (80 psig), 130°C (266°F) ****		689 kPa (100 psig), 60°C (140°F); 345 kPa (50 psig), 100°C (212°F)	689 kPa (100 psig), 80°C (176°F); 552 kPa (80 psig), 110°C (230°F)***	
Sample flow rate	56.8 L/min. (15 gpm) max. Lower flow rates for viscous solutions, abrasives and high-purity water.				—		
Installation	Mounting Kit supplied for wall or other flat-surface mounting. Sample connections 3/4” NPT, female inlet and outlet.				3/4” pipe support in tank (pipe not supplied). Use plastic pipe with plastic housing.		
Weight	1.4 kg (3 lb.)	1.87 kg (4 lb.)	2.7 kg (6 lb.)	2.3 kg (5 lb.)	1.4 kg (3 lb.)	2.7 kg (6 lb.)	1.87 kg (4 lb.)

* Satisfactory for high-purity water down to approximately 5 mhos/cm at less than 0.3 liter per minute flow.
** Conforms to A.P.I. and ASME codes for 150-psig operation. Recommended for use in high-purity water where ultimate stability is required.
*** If mounting is used above 110°C (230°F), electrodes and temperature compensator must be glass-bodied and preamp cannot be located in mounting. specify 20 for Table I and order an appropriate preamp module as a separate item.
**** For CRN approval maximum pressure with 516SS cover is 65 psig; maximum pressure with polypropylene cover is 45 psig.

Relative Humidity Limit	Usable at 100% R.H.
Electrode Support	Ryton
O-Rings	Viton A is standard. Available in ethylene-propylene rubber (E.P.M.) Table IV = 301.
O-Ring Washers	Polypropylene (not in contact with sample).
Compression Nut	Delrin (not in contact with sample).
Dimensions	Approximately 102 mm OD x 279 mm long (4” x 11”).
Electrical Connections and Immersion Support Pipe	3/4” NPT female.

Electrode Specifications						
Part	**Electrode**	**CONSTRUCTION**			**Temp.**	**Pressure**	**Electrode**
Number	**Type**	**Internal fill**			**Range**	**Limit**	**Termination**
51204976-002	Durafet II pH Measuring Only (0-14 pH)	None	FET	Ryton	-10 to 110°C (14 to 230°F)	100 psig @ 110°C; 150 psig @ 80°C	Quick disconnect cable to electrode and preamplifier
31117390	Glass pH Measuring — General Purpose	KCl & Buffer	glass	glass	10 to 80°C (50 to 176°F)	100 psig @ 110°C; 150 psig @ 80°C	Screw cap
31117399	Antimony pH Measuring (2-11 pH range) recommended where fluorides are present below 5 pH	None	antimony	Ryton	5 to 75°C (41 to 167°F)	150 psig @ 75°C	Screw cap
31117481	Reference—General Purpose, long life	KCl gel	repl. ceramic	Ryton	-5 to 110°C (23 to 230°F)	50 psig @ 110°C; 150 psig @ 60°C	6” wire; spade lug
31035832	Reference (double-junction)—Sulfide-containing processes	NH4 NO3 gel	ceramic	Ryton	-5 to 110°C (23 to 230°F)	50 psig @ 110°C; 150 psig @ 60°C	6” wire; spade lug
51204976-001	Durafet II pH Combination; Meas. Ref. & temp. compensator (0-14 pH)	KCl gel	FET	Ryton	-10 to 110°C (14 to 230°F)	100 psig @ 110°C; 150 psig @ 80°C	Quick disconnect cable to electrode and preamplifier
31117486	Glass pH Combination; Meas. & Ref.—General Purpose	KCl gel	meas.: glass Ref.: ceramic	Ryton	10 to 100°C (50 to 212°F)	30 psig @ 100°C; 100 psig @ 60°C	Screw cap
31020751	ORP Combination: Meas. & Ref.—for Chrome treatment	KCl gel	meas.: glass Ref.: ceramic	Ryton	-5 to 130°C (23 to 266°F)	30 psig @ 100°C; 100 psig @ 60°C	12’ cable; tinned
31020749	ORP Combination; Meas. & Ref.—for Chrome or Cyanide treatment	KCl gel	meas.: gold Ref.: ceramic	Ryton	-5 to 100°C (23 to 212°F)	30 psig @ 100°C; 100 psig @ 60°C	12’ cable; tinned
31152137	Auto. Temperature Compensator—Use with Honeywell analog-based inst., 721 ohms at 25°C	None	None	Ryton	-5 to 110°C (23 to 230°F)	150 psig @ 110°C	6” 2-wire; spade lugs
31022289	Auto. Temperature Compensator—Use with Honeywell microprocessor-based inst., 8550 ohms at 25°C	None	None	Ryton	-5 to 110°C (23 to 230°F)	150 psig @ 110°C	6” 2-wire; spade lugs

Durafet II is a registered trademark of Honeywell.

Ryton is a Phillips Petroleum tradename for polyphenylene sulfide.

For More Information

Learn more about how Honeywell's 7773 Multipurpose pH/ORP Electrode Mountings can be used in a wide variety of process applications, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

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Technical Information

Honeywell

Durafet II and Meredian II Combination pH/ORP Electrodes for Honeywell 7777 Mountings Series 7777 Specifications

70-82-03-06 July 2004

Overview

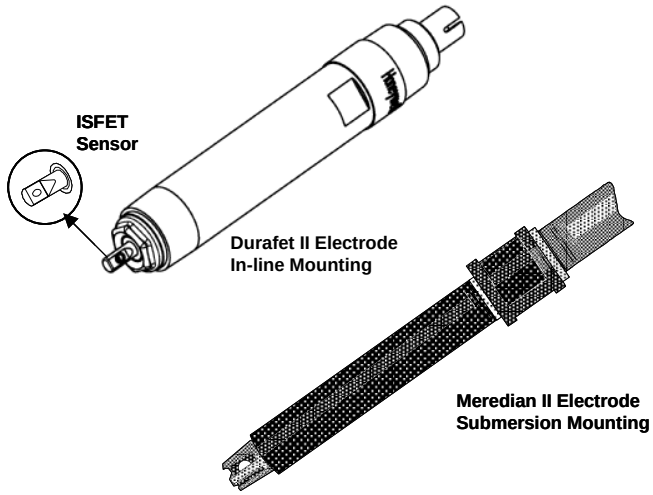
Honeywell's 7777 Series of electrode mountings enables an user to interface Durafet® II pH electrodes to a process via a ¾" threaded connection and Meredian® II by either submersing the electrode or mounting it into a ¾" threaded connection.

Durafet II pH electrodes are the first industrial ISFET-based pH sensors. They join Honeywell's industry-proven glass pH electrodes in the 7777-Series mounting to provide accurate and dependable pH measurement.

Description

The Durafet II and Meredian II pH electrodes offer a reliable combination of measuring and reference electrodes together with an integral automatic temperature compensator in a 1-piece corrosion-resistant molded Ryton body. Quick disconnect plugs enable easier installation and maintenance than with any other electrode available. The compact Durafet II and Meredian II electrodes with 3/4" NPT male connections are easily adapted for in-line mounting without O-rings or special seals. Meredian II is also available in Immersion and On-line mounting.

The large surface area of the reference junction resists fouling and maintains reliable low-impedance contact with the process solution. The reference junction's symmetrical annular shape surrounding the measuring element minimizes the effects of electrical current passing through the process solution. This offers a significant improvement when compared with unsymmetrical electrode designs that develop large offset potentials and prohibit pH measurements in applications such as electroplating tanks or electrolytic cells.



Durafet II Combination Electrodes feature state-of-the-art pH measurement technology, using an ISFET (Ion Sensitive Field Effect Transistor) sensing element. This virtually unbreakable, truly solid state electrode provides especially fast response. Durafet II sensors produce a direct low impedance pH signal for outstanding reliability even at low temperatures and with no sodium error or ORP interference. Durafet II electrodes are available with a quick disconnect cable. The combination Durafet II pH electrode incorporates a replaceable reference junction frit and gel, assuring long life even in the most highly fouling applications. In addition, Durafet II electrodes can be interfaced with virtually any existing pH instrumentation, thus allowing wide freedom of use.

Meredian II electrodes offer glass compositions that provide low sodium error as well as optimum durability at operating temperatures. Long term accuracy and performance are assured. Meredian II electrodes include a permanent reference junction and gel fill for maintenance-free operation. The internal automatic temperature compensator is compatible with both analog and microprocessor-based Honeywell instruments, when used with the appropriate preamplifier.

Features

Durafet II Electrode

- Uses ISFET (Ion Sensitive Field Effect Transistor) technology for exceptionally fast response
- Virtually unbreakable, truly solid state
- Integral or quick disconnect cable options
- New “no epoxy” packaging design
- Reference junction frit and gel are replaceable
- Low impedance pH signal
- One electrode for entire pH and temperature ranges
- Retrofittable to existing pH instrumentation.
- Suitable for in-line applications

Meredian II Electrode

- Integral leadwire with quick disconnect at preamp
- Glass formulations that insure uncompromised performance
- ORP (Redox) electrodes with platinum or gold sensors
- Suitable for in-line and submersion applications; may be mounted in any position

7777 Mounting

- FM-approved intrinsically safe for Class I, Division 1, Group A, B, C, D areas with APT2000 Series transmitters and barriers.
- Rugged combination electrodes with fast-responding integral automatic temperature compensator.
- Molded, chemically-resistant Ryton body.
- Large reference electrode volume uses a true gel fill that maintains high viscosity with temperature.
- Rugged molded NEMA 6 submersible polypropylene preamp module housing.

Immersion Mounting

Figure 1
Long Quick-Disconnect
to Preamplifier Module

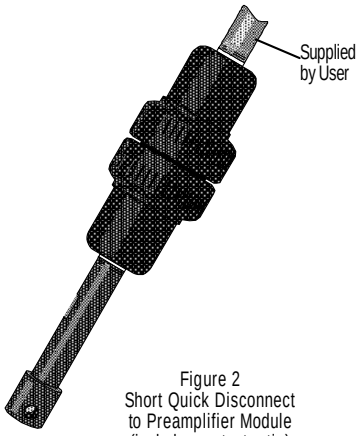


Figure 2
Short Quick Disconnect
to Preamplifier Module
(includes protector tip)

Preamplifier Module

The submersible NEMA 6 and IP68 Preamplifier Module can be mounted directly on a submersion electrode (Figures 1 & 2) or can be located a short distance away from the electrode (Figure3). The preamplifier operates as a signal conditioner, permitting the high impedance, low level electrode output to be transmitted long distance with ordinary unshielded wire.

The Honeywell preamplifier design assures long-term reliability under industrial conditions. Guarded, encapsulated circuitry maintains the high impedance signal integrity, even in dirty and humid conditions. The inner metallic preamplifier case completely shields the signal from electrical noise and additional circuitry protects the unit against nearby lightning strikes.

Durafet II and Meredian II electrodes and preamplifiers are compatible with all current Honeywell pH analyzers, transmitters, and controllers.

Durafet II Adapter Module

To use a Durafet II electrode with other instruments, an adaptor module (Figure 4) is available.

It provides a temperature compensated pH signal to the conventional electrode input of measuring instruments other than Honeywell. Temperature compensation must be fixed at 25°C on the instrument. Also available is the new battery-powered interface module, P/N 31075773.

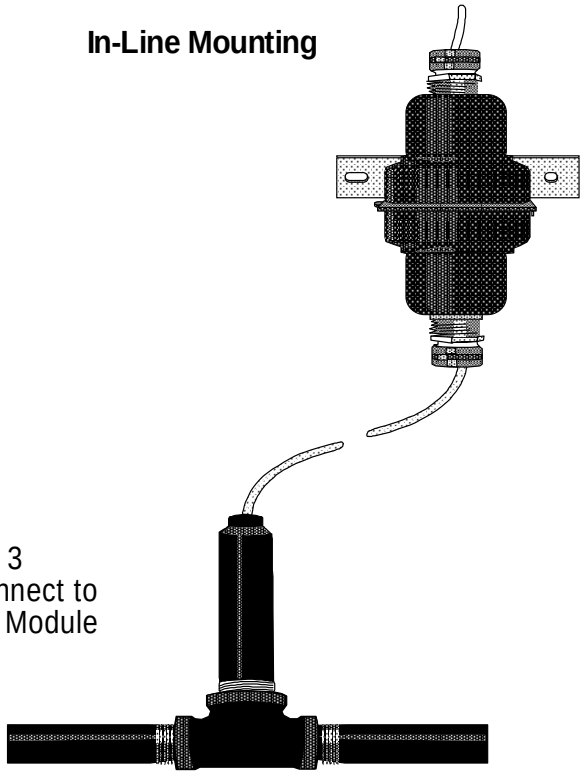


Figure 3
Quick Disconnect to
Preamplifier Module

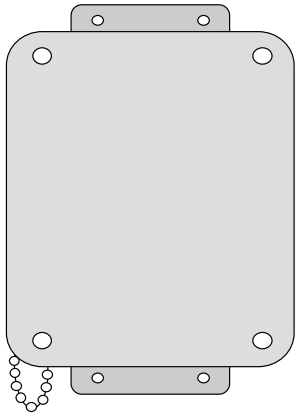


Figure 4
Adaptor Module
31079290 and 31084755

Specifications

Electrode	
Pressure and Temperature Rating	For Durafet II pH Electrodes 51205554-001(In-line) and Meredian II pH Electrodes 31074387, 31074386, 31074383, 31074396, 31074397, 31074398, 31074399, and 31074382: 345 kPa (50 psig) @ 100°C, 690 kPa (100 psig) @ 50°C For ORP Meredian II electrodes 31074388 gold: 345 kPa (50 psig) @ 100°C, (690 kPa 100 psig) @ 50°C 31074389 platinum: 345 kPa (50 psig) @ 110°C, 690 kPa (100 psig) @ 50°C
Operating Range	0-14 pH
Mounting	In-Line: 3/4” NPT male process connection, fits into standard 3/4” sch. 40 metal pipe tee or special dimension plastic tee (see Accessories in Module Selection Guide) Immersion: 3/4” NPT male to support pipe or preamp module
Wetted Materials	Glass pH: Ryton, glass, EPM, ceramic ORP: Ryton, platinum or gold, epoxy, EPM, ceramic Durafet II pH: Ryton, silicon, EPM, Vitron
Dimensions	165 mm long x 25 mm dia. (6 1/2” x 1”)
Weight	Approximately 0. 23 kg (0.5 lb)
Preamplifier Module (31075704, 31075705, and 31079288)	
Housing Material	Glass-filled polypropylene
Connections	Two 3/4” NPT female
Dimensions	Approximately 232 mm H x 111 mm dia. (9 1/8” x4 3/8”)
Weight	Approximately 0.9 kg (2 lbs)

Adaptor Module (31079290 and 31075773)	
Housing	31079290: Molded fiberglass with stainless steel hardware. 241 x 184 x 102 mm (9 1/2” x 7 1/4” x 4”). NEMA 4X, IP65. 31075773: Molded fiberglass. 140 x 80 x 89.6 mm (5.514” x 3.150” x 3.527”). NEMA 4
Connections	31079290: Two 3/4” conduit holes 31075773: Two 1/2” conduit holes
Power	31079290: 108-132 V, 50-60 Hz, 15 VA 31075773: 3 V lithium battery pack
Weight	31079290: 2.3 kg (5 lbs) 31075773: 0.45 kg (1 lb)

Durafet II and Meredian are registered trademarks of Honeywell

For More Information

Learn more about how Honeywell's Durafet II and Meredian II Combination pH/ORP Electrodes can provide fast, accurate and dependable pH measurement in the most demanding applications, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

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Honeywell

Durafet III Electrode Mounting with Vario Pin Connector
Series 7777 Specifications

70-82-03-51 August 2004

Overview

Honeywell's 7777 Style Series of electrode mountings enables a user to interface Durafet III pH electrodes to a process by either submersing the electrode or mounting it into a ¾" threaded connection.

Durafet® III pH electrodes use a non-glass, ISFET (Ion Sensitive Field Effect Transistor) technology for the pH sensor. This solid-state ISFET technology eliminates the conventional fragile glass pH sensor. The Durafet pH electrode, with over 11 years of industry-proven application experience, provides fast, accurate and dependable pH measurement in the most demanding industrial applications. Typical applications include wastewater influent/effluent, neutralization, cooling towers and process pH measurements.

Durafet III pH electrodes offer a reliable combination of measuring and reference electrodes together with an integral automatic temperature compensator in a 1-piece corrosion-resistant molded Ryton body. A quick-disconnect Vario Pin Connector enables easier installation and maintenance than with any other electrode available. The compact Durafet III electrodes with 3/4" NPT male connections are easily adapted for in-line or submersion mounting without O-rings or special seals.

Features

Durafet III Electrode

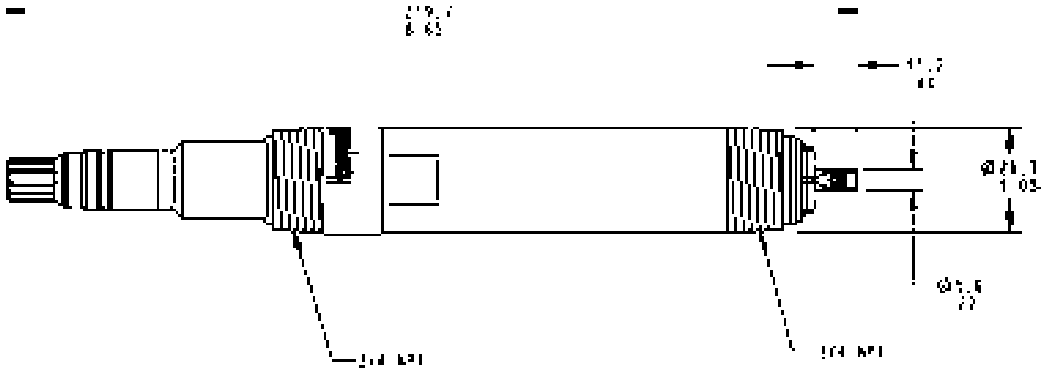
- Uses ISFET (Ion Sensitive Field Effect Transistor) technology for exceptionally fast response
- Virtually unbreakable, truly solid state
- ***New*** Vario Pin quick disconnect, IP68 waterproof cable for easy electrode installation/replacement
- "No epoxy" packaging design for greater reliability
- Reference junction frit and gel are replaceable
- Low impedance pH signal
- One electrode for entire pH and temperature
- Retrofittable to existing pH instrumentation.

7777 Style Durafet III

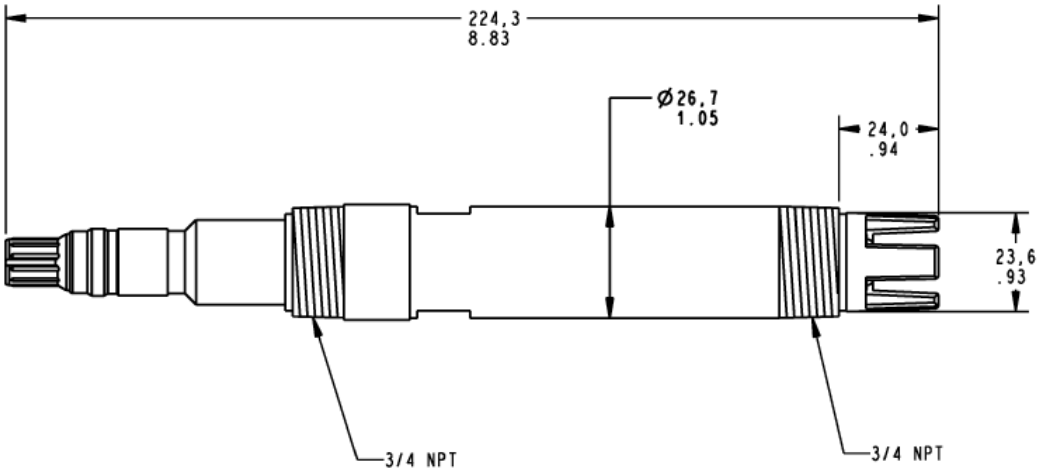
7777 Style Mountings:

- FM-approved intrinsically safe for Class I, Division 1, Group A, B, C, D areas with APT 2000/DirectLine transmitters and barriers.
- Rugged combination electrodes with fast-responding integral automatic temperature compensator.
- Molded, chemically-resistant Ryton body.
- Suitable for in-line and submersion applications; may be mounted in any position.
- Large reference electrode volume uses a true gel fill that maintains high viscosity with temperature.
- Cap Adapter cable options for mounting to APT series analyzers.
- DirectLine remote cable options for mounting to DL421 DirectLine modules.
- Other cable options to mount to UDA 2182 Analyzer and older Honeywell instruments and preamps.

Dimensions



Durafet III in-line mounting (P/N 51453503-001)



Durafet III submersion mounting (P/N 51453503-005)

Durafet III Cable options

Cap Adapter

The Cap Adapter is essentially a preamp that is an integral part of the electrode cable. It does not require a separate mounting. The output of the Cap Adapter is connected directly to an pH instrument (9782 or APT series).

UDA2182 Cable

The ***NEW!*** UDA2182 Dual Input Analyzer accepts inputs from the Durafet III pH electrode. The input termination in the UDC2182 is screw terminals. The UDA2182 Cable has skinned and tinned leads to connect to these terminals.

DirectLine Remote pH Cable

The DL421 pH module will accept a remote mounted Durafet III pH electrode. The DirectLine Remote pH Cable has a Vario Pin connector on one end and a DirectLine module connector on the other end. (See MSG 51-52-16-71 to order these options.)

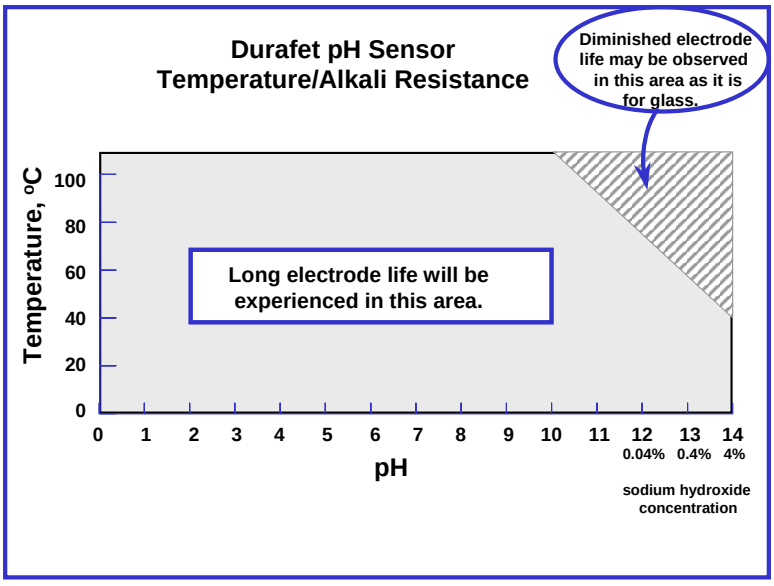
Preamp Cables

In older instrumentation the Durafet pH input was connected to a preamp (internal or external). The ***NEW!*** Durafet III pH electrode can be retrofitted to this older instrumentation by using the Vario Pin Preamp cable. This cable has a Vario Pin connector on one end and an 8-pin Amp connector on the other end.

Specifications

Operating Range	0 to 14 pH
Temp. Rating	Electrode: -10 to 110° C (+14 to 230° F) Cap Adapter Cable: 0 to 70° C (+32 to 158° F)
Wetted Materials	Electrode: Ryton body, silicon ISFET die, Ceramic reference junction, Viton media seal, nickel plated brass, EPM reference frit seals Cables: PVC, nickel plated brass, Viton
Pressure Rating	345 kPa (50 psig) @ 100° C (212° F), 690 kPa (100 psig) @ 50° C (122° F)
Mounting, In-Line	3/4 inch NPT male process connection, fits into standard 3/4 inch sch. 40 metal pipe tee or special dimension plastic tee (see accessories in Model Selection Guide)
Mounting, Immersion	3/4 inch NPT male to support pipe (sch. 40 metal)
Electrical Connection	Vario Pin, 11 conductor connector, IP68 rated @ 33 ft. immersion for 1000 hrs.
Cable lengths	DirectLine Remote Cables 6.096m (20') *P/N 51453225-001* 15.24m (50') *P/N 51453225-002* Cap Adapter Cables (9782P & APT Series) 6.096m (20') *P/N 51453388-001* 15.24m (50') *P/N 51453388-002* Preamp Cables 6.096m (20') *P/N 50001623-001* 15.24m (50') *P/N 50001623-002* UDC2182 Cables 6.096m (20') *P/N 50001391-001* 15.24m (50') *P/N 50001391-002*
Dimensions	220 x 27 mm dia. (8.65 x 1.05 inches)
Weight	Approximately 0.23 kg (0.5 lb)

The Durafet III ISFET sensor lifetime is affected by exposure to high pH and high temperature solutions. The following graph can be used as a guideline to determine if the electrode will be affected by these adverse conditions.



Durafet III is a registered trademark of Honeywell.

For More Information

Learn more about how Honeywell's 7777 Style Durafet III Electrode Mounting with Vario Pin Connector can provide fast, accurate and dependable pH measurement in the most demanding applications, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions
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Technical Information

Honeywell

pH/ORP Electrode Insertion/ Removal Assemblies Series 7774 Specifications

70-82-03-05 May 1999

Overview

The 7774 Insertion/Removal Assemblies, which accommodate Durafet® II and Meredian® series combination (single-probe) pH or ORP electrodes, are designed for use in processes under pressure because the electrode can be inserted or removed without interrupting the process. Insertion can be into a pipeline, tank wall, or other vessel — in any position — for applications such as boiler water analysis, demineralization, reverse osmosis, pharmaceutical and chemical production, waste treatment, and pulp and paper production.

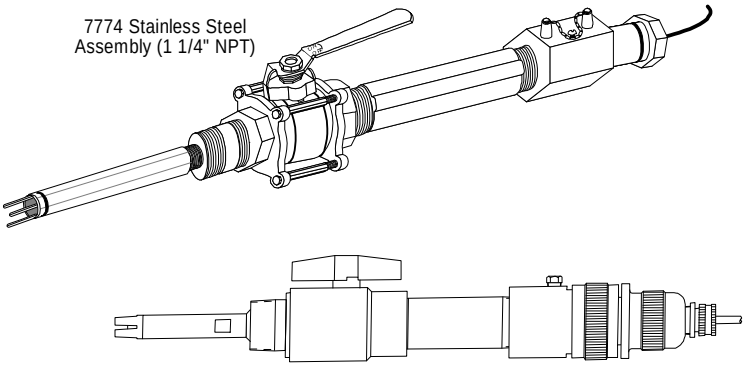
Description

The 7774 assembly includes a valve assembly and a Durafet II or Meredian electrode mounted on a support tube. With the valve assembly connected to the process, the electrode is inserted into the assembly for a positive seal. When the valve is opened, the electrode is inserted into the process medium and locked in position. To remove the electrode, this sequence is reversed.

The electrode assembly can be safely inserted or withdrawn at process pressures up to 50 psig. Plastic and 316 stainless steel wetted materials are available for applications requiring chemical resistance or for high-temperature operation. A purge port on the plastic assembly permits automatic or manual inline cleaning or flushing.

Features

- New Durafet II nonglass pH electrode options
- Electrode can be easily inserted or withdrawn under pressure without interrupting the process
- Usable to 100 psig
- Rugged, corrosion-resistant insertion mountings of CPVC plastic or 316 stainless steel
- Nonfouling probe tips for slurries (such as pulp stocks up to 14% solids)



7774 Plastic Assembly (1 1/2" NPT)

- Most electrodes can be mounted in horizontal or inverted position
- Local preamplifier module permits signal transmission over long distances with unshielded leadwire
- Assemblies have reliable restraining mechanisms for safe removal under pressure
- Suitable for use in Class I, Division 2, Group A, B, C, and D locations FM approved intrinsically safe options for Division 1 areas with 7079 Transmitter
- Plastic valve assembly extension permits immersion of electrode as far as 12” into process

Electrodes

Durafet II combination electrodes feature state-of-the-art pH measurement technology, using an ISFET (Ion Sensitive Field Effect Transistor) sensing element. This virtually unbreakable, truly solid state electrode provides especially fast response. Durafet II sensors produce a direct low impedance pH signal for outstanding reliability even at low temperatures and with no sodium error or ORP interference. The combination Durafet II pH Electrode incorporates a replaceable reference junction frit and gel, ensuring long life even in the most highly fouling applications. In addition, Durafet II electrodes can be interfaced with virtually any existing pH instrumentation.

Electrodes

Meredian pH Electrodes offer a selection of low- or high-temperature glass that provides low sodium error as well as optimum durability at operating temperatures. Long-term accuracy and performance are ensured. Meredian electrodes include a permanent reference junction and gel fill for maintenance-free operation.

Preamplifier

The preamplifier conditions the Meredian electrode signal locally to a low impedance signal that can then be sent over ordinary unshielded wire to the Honeywell analyzer or transmitter. The preamplifier system has high immunity to RF noise. The unique geometry of the electrode design provides the means to obtain accurate, continuous measurements in the presence of streaming potentials or high solution currents in electrolytic processes.

The 7774 Assembly can include a preamplifier module in a NEMA 4X enclosure for mounting within 10’ of Meredian electrodes. See Figure 1.

Another preamplifier option is an environmentally sealed (encapsulated) high-impedance amplifier to which the Durafet II or Meredian combination electrode is directly connected. These preamplifiers shown in Figure 2, feature Honeywell’s quick-disconnect plug, allowing easy installation of the electrode using no tools. A second quick-disconnect plug permits removal of the preamplifier for troubleshooting or routine maintenance.

Durafet II Adaptor Module

To use a Durafet II electrode with other than Honeywell instruments, an adaptor module (Figure 3) is available. It provides a temperature compensated pH signal to the conventional electrode input of measuring instruments other than Honeywell. Temperature compensation must be fixed at 25°C on the instrument. Also available is the new battery-powered interface module. P/N 075773.

Automatic Temperature Compensation

The Durafet II and Meredian pH (not ORP) electrodes include an integral automatic temperature compensator unless noted otherwise.

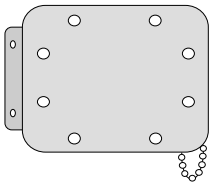


Figure 1 - 31028698, 31316529 or 31026395 Preamp Module for Meredian electrodes with tinned leadwire termination. Supplied with stainless steel assemblies except those using Durafet electrodes.

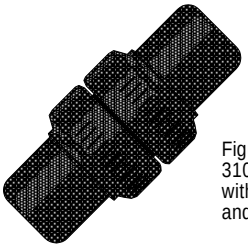


Figure 2 - 31079288 Preamp Module for Durafet Electrodes and 31075704 or 31075705 Preamp Module for Meredian II Electrodes with quick disconnect plug only. Supplied on all plastic assemblies and stainless steel assemblies using Durafet electrodes.

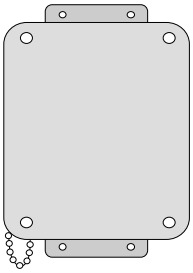


Figure 3 - Adaptor Module 31079290 and 31084755 for Durafet interface to other-than-Honeywell pH instruments

Specifications

316 SS Assembly	
Pressure and Temperature	Determined by electrode used: 31117489 pH 30 psig @ 100°C, 100 psig @ 60°C 31020749 Gold ORP 30 psig @ 100°C, 100 psig @ 60°C 31020751 Pt ORP 50 psig @ 130°C, 100 psig @ 60°C 31050383 pH 50 psig @ 100°C, 75 psig @ 50°C 31050381 pH 50 psig @ 80°C, 75 psig @ 50°C 31055546 pH 50 psig @ 80°C, 75 psig @ 50°C 51204976-003 pH 50 psig @ 110°C, 100 psig @ 60°C 51204976-004 pH 50 psig @ 110°C, 100 psig @ 60°C 51204976-005 pH 50 psig @ 110°C, 100 psig @ 60°C
Pressure Limit for Insertion or Removal	345 kPa (50 psig)
Flow Velocity	Maximum 5 ft./sec (1.5 m/sec)
Mounting	1 ¼" NPT male process connection
Insertion Depth	6" nominal (not adjustable)
Overall Length	From process connection: 533 mm (21")
Allowance Required for Electrode Removal	Measured from process connection: Approximately 965 mm (38")
Electrical Classification	With preamplifier: Suitable for use in Class I, Division 2, Group A, B, C, and D locations. When used with Intrinsic Safety barriers and a 7079 Transmitter, most stainless steel options are FM-approved for use in Class I, Division 1, Group A, B, C, and D locations.
Wetted Materials	Mounting: 316 SS ball valve and extension tube, Viton Teflon seals Glass pH: Ryton, glass, EPM, ceramic ORP: Ryton, platinum or gold, epoxy, EPM, ceramic Durafet II pH: Ryton, silicon, EPM
Weight	5.0 kg (11 lb) including electrode and removal device.
Plastic Assembly	
Pressure and Temperature Limits	345 kPa (50 psig) at 88°C (190°F); 690 kPa (100 psig) at 50°C (120°F) maximum pressure for insertion/removal: 345 kPa (50 psig)
Flow Velocity	5 ft./sec (1.5 m/sec)
Mounting	1 1/2" NPT male process connection
Purge Port Connection	1/4" NPT female (plug supplied)
Insertion Depth	The CPVC plastic removal device is supplied with a 15 3/8" pipe nipple for nominal 6" insertion depth. An accessory nipple option (21 3/8") provides 12" nominal insertion depth; the user may make up a similar schedule 80, CPVC nipple with 1/2" NPT male at both ends for intermediate insertion depths.
Overall Length	Measured from the process connection: Approximately 508 mm (20")
Allowance Required for Electrode Removal	Measured from the process connection: Approximately 1423 mm (38")
Electrical Connection	With preamplifier: Suitable for use in Class I, Division 2, Group A, B, C, and D locations. Preamp module has a NEMA 4X enclosure. Most options are FM-approved Intrinsically Safe for Class I, Division 1, Group A, B, C, and D locations when used with the 7079 Transmitter and barriers.

Wetted Materials	Mounting: CPVC ball valve and extention tube, Viton, Teflon and EPDM seals Glass pH: Ryton, glass, EPM, ceramic ORP: Ryton, platinum or gold, epoxy, EPM, ceramic Durafet II pH: Ryton, silicon
Weight	1.6 kg (3.5 lb) including electrode and removal device.
Preamplifier Module (31075704, 31075705, and 31079288)	
Housing Material	Glass-filled polypropylene
Connections	Two 3/4” NPT female
Dimensions	Approximately 232 mm H x 111 mm dia. (9 1/8” x4 3/8”)
Weight	Approximately 0.9 kg (2 lbs)
Adaptor Module (31079290, 31084755 and 31075773)	
Housing	31079290 and 31084755: Molded fiberglass with stainless steel hardware. 241 x 184 x 102 mm (9 1/2” x 7 1/4” x 4”). NEMA 4X, IP65. 31075773: Molded fiberglass. 140 x 80 x 89.6 mm (5.514” x 3.150” x 3.527”). NEMA 4
Connections	31079290 and 03184755: Two 3/4” conduit holes 31075773: Two 1/2” conduit holes
Power	31079290: 108-132 V, 50-60 Hz, 15 VA 31084755: 208-264 V, 50-60 Hz, 15 VA 31075773: 3 V lithium battery pack
Weight	31079290 and 31084755: 2.3 kg (5 lbs) 31075773: 0.45 kg (1 lb)

Durafet II and Meredian are registered trademarks of Honeywell.

For More Information

Learn more about how Honeywell’s 7774 pH/ORP Electrode Insertion/ Removal Assemblies can be used for processes under pressure, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

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Technical Information

Honeywell

7794 DVP Sanitary Durafet III pH Electrodes with Vario Pin Connector Specifications

70-82-03-53 February 2010

Description

Honeywell introduces the Sanitary Durafet® III pH electrode, a non-glass, unbreakable, ISFET (Ion Sensitive Field Effect Transistor) technology based pH sensor. The Sanitary Durafet III electrode is designed to meet 3-A Sanitary Standards. Solid state ISFET technology eliminates the conventional, fragile glass pH sensor. The unbreakable pH sensor can be inserted directly into the process without the fear of product contamination. pH measurement can be online and continuous — no time-consuming grab sampling is necessary. This pH electrode, with over 9 years of industry-proven application experience, provides fast, accurate and dependable pH measurement in the most demanding food and dairy applications.

The Sanitary Durafet III pH electrode has an integral, tri-clamp flange for easy mounting in the process. Cable options available for remote mounting to the innovative Honeywell DirectLine® Sensor Module. It is also available with the Cap Adapter cable for connection to Honeywell instrumentation (APT and 9782 Series), as well as selected competitors' instrumentation. All cable options use the Vario Pin connector that provides an IP68, waterproof connection to the electrode.

Cap Adapter

The Cap Adapter cable option is essentially a preamplifier that is an integral part of the electrode cable. It does not require separate mounting. The output from the Cap Adapter can be connected directly to a pH instrument (9782 or APT2000). It is available in lengths of 20' and 50'.

Optional Cap Adapter

7794 Sanitary Durafet III Electrode

Features

- Designed to meet rigorous environmental requirements of the Food and Dairy industries
- Authorized to use the 3-A symbol
- Rugged – does not employ conventional glass membrane. Uses ISFET, solid state sensor
- New Vario Pin quick disconnect, IP68 waterproof cable for easy electrode installation/replacement
- New "no epoxy" packaging design for greater reliability
- Reference electrode and compensating temperature sensor integral with electrode
- Remote mounting option for DirectLine sensor
- Connection capability to standard tri-clamp fittings
- Choice of cable lengths: 20' or 50'
- Six (6) models available with varying flange size and immersion lengths

Specifications

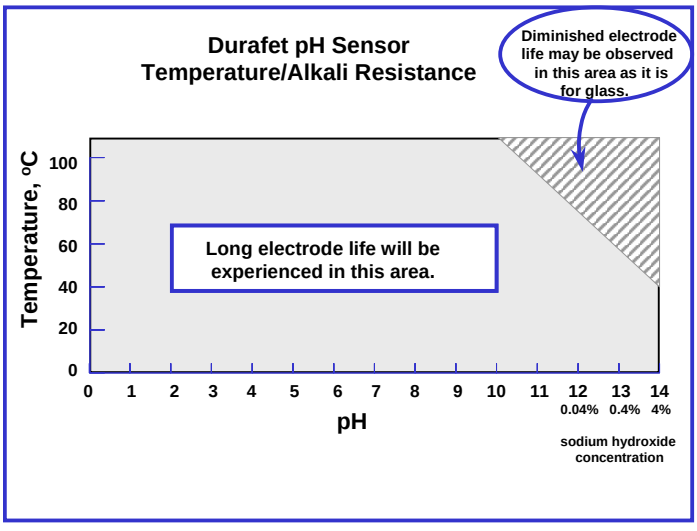
Sanitary Durafet III Electrode	
Operating Range	0-14 pH
Operating Temperature Range	–10 °C to 110 °C [14 °F to 230 °F]
Sterilization Conditions (non-operating)	121 °C maximum at 50 psig
Maximum Ratings	121°C @ 50 psig 100 °C @ 100 psig
Operating Process Pressure	0 to 690 kPa from –10 °C to 100 °C 0 to 345 kPa @ >100 °C 0 to 100 psig from 14 °F to 212 °F 0 to 50 psig @ >212 °F
Electrode Body	Fortron®, FDA-compliant Polysulfone, FDA-compliant Ceramic reference junction Silicon ISFET measuring sensor Viton® sensor seal
Electrode Mounting	Connects to standard CIP fittings, Tri-Clamp® or equivalent
Cables	DirectLine Remote Cable: 20 feet and 50 feet length Cap Adapter (for 9782P and APT Series): 20 feet and 50 feet length
Electrical Connection	Vario Pin, IP68 rated
Weight	*1-1/2":* 181.7 g [6.4 oz.] *2":* 190.3 g [6.7 oz.] *3":* 229.9 g [8.1 oz.]

System Pressure Below Atmospheric

If the user's processing system is not designed to automatically shut down when the system pressure becomes less than that of the atmosphere with a restart only if the system is re-sterilized, then it shall have a steam or other sterilizing medium chamber surrounding the joint between the pH sensor and the process. The joint shall be constructed so that the steam chamber or other sterilizing medium chamber can be exposed for inspection.

The Sanitary Durafet III ISFET

Sensor lifetime is affected by exposure to hot caustic solutions that can be present in CIP cycles of Food and Dairy applications. The following graph can be used as a guideline to determine if the Sanitary Durafet III pH electrode should be taken out of the process during the cleaning cycle. For expected lifetime at specific temperatures and caustic concentrations based on exposure time contact your local Honeywell Sales representative.



Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose**. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Durafet III and DirectLine are registered trademarks of Honeywell.

For More Information

Learn more about how Honeywell's 7794 DVP Sanitary Durafet III pH Electrodes with Vario Pin Connector can be used to meet rigorous environmental requirements of the food and dairy industries, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

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February 2010
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Honeywell

HB547 – Multi-Installation Sensor Cartridge
Series HB
Specifications

70-82-03-55 July 2007

Overview

Honeywell's pH electrodes for applications with high temperatures and pressures in addition to low and high pH. The HB Series complements the other pH offerings – the Durafet and Meredian electrodes.

HB547 Electrode

The **HB547** is:

- intended for use with ball valve insertion assemblies (see Model Selection Guide for details)
- rugged, versatile and simple to use
- compatible with most industrial transmitters and analyzers

Honeywell's HB Series of electrode mountings utilize the patented Axial Ion Path Reference Cell Technology.
The Axial Ion Path Technology:

- prevents sensor poisoning
- prevent internal leaks
- prevent internal plugging
- allows extreme temperature and pressure tolerance
- allows for long life in low and high pH applications

Ball Valve Assembly and Electrode

The HB547 pH electrode is intended for use with specified ball valve assemblies.

Description

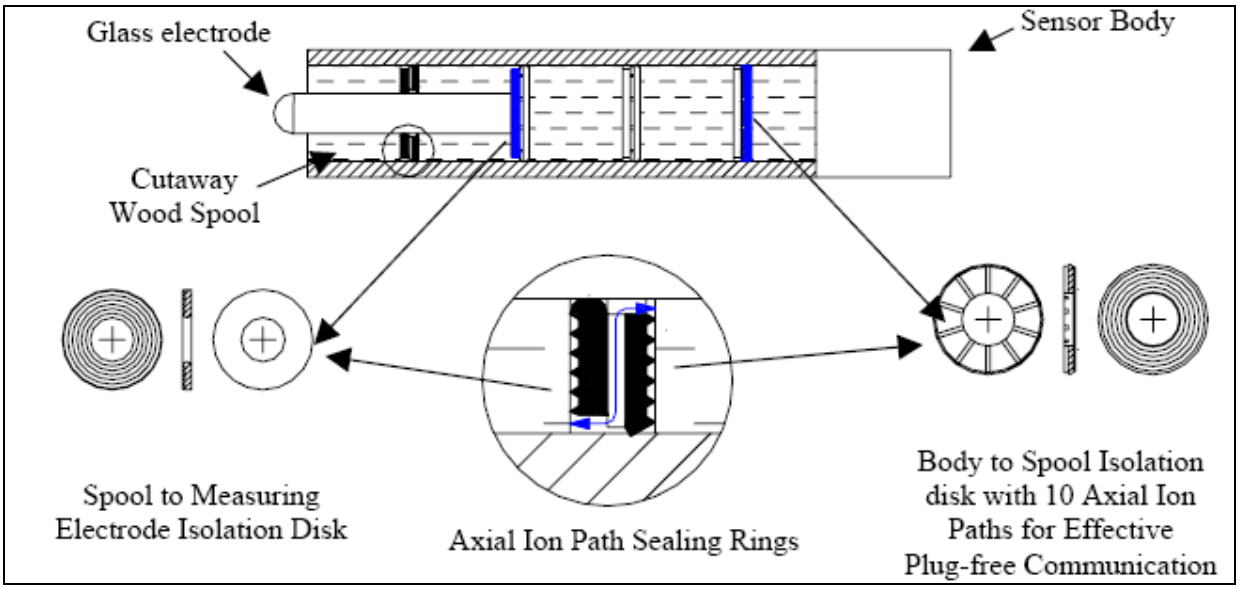
The **HB547** pH electrode offers a reliable combination of measuring and reference electrodes together with an integral automatic temperature compensator in a 1-piece corrosion resistant body (the body material is chosen by the customer).

The **HB547** pH electrodes are designed with 1" MNPT Wrench-tite or 1-1/4" MNPT Hand-tite compression fittings. These sensors require 1-1/4" or larger full port valve. The insertion depth is user selectable.

Axial Ion Path Reference

Like other rugged semi-solid state references, the reference is formed by a series of wood segments impregnated with KCL. The difference with the Axial Ion Path (A.I.P.) technology is where others utilize an epoxy or impermeable barrier between each of the wood segments; the A.I.P. uses a pair of formed discs.

When the two formed disc faces are positioned adjacent to one another they form an Axial Ion Path (filled with electrolyte) between each of the segments. The Axial Ion Path provides a more complete transition of KCl ions between the wood segments forward and creates a difficult and longer distance for poisons traveling back into the reference from the specimen fluid.



This is a porous surface, which passes ions between the reference and measurement fluid. The primary function is to allow very small amounts of KCl to leach from the reference and provide the millivolts necessary for pH measurement. The secondary function is to maintain a barrier between the measurement fluid and the reference so that the measurement fluid does not rapidly poison or foul the reference.

Temperature Compensator

This is typically a component (RTD, Resistor, Thermistor) that produces a proportional resistance to the temperature of a measured solution. The resistance is understood by the pH Transmitter/Indicator so it can make adjustment to the measurement slope to match the effect of temperature on the sensor. With conventional glass measuring electrodes the T.C. is typically located near the measurement bulb to reduce the time necessary to recognize the solution temperature.

The **HB547** allows the user to specify which temperature compensator is right for their instrument. The user has the following options:

- **Honeywell 8550 ohm**
- PT1000 RTD
- PT100 RTD Capillary. Hi-temp spec 125C
- PT1000 RTD Capillary, Hi-temp spec 125C

Features

HB547 Electrode

- Uses Axial Ion Path reference technology
- One electrode for entire pH and temperature ranges.
- ***Intended for use with ball valve assemblies***
- Integral automatic temperature compensator
- Chemically resistant CPVC, Kynar or Polypropylene body
- User can specify following:
  - Body Material
  - O-Ring Material
  - Measuring Electrode
  - Tip Configuration
  - Thermocompensation
  - Insertion Depth
  - Cable Configuration
  - Lead Terminations
- Great for high temperature and high pressure applications
- Can be used in both low and high pH conditions
- Insertion-retraction device
- Compatible with most industrial transmitters and analyzers

Specifications

Electrode	
Pressure and Temperature Rating	CPVC & Polypropylene: 100 psig, 100°C Kynar: 150 psig, 140°C
Operating Range	0-14 pH
Mounting	Ball-valve insertion: 1” MNPT Wrench-tite, or 1-1/4” MNPT Hand-tite compression fitting. Requires 1-1/4” or larger full port ball valve. Insertion depth user selectable. *See Accessories in Module Selection Guide*
Wetted Materials	Kynar, CPVC, Polypropylene (Body Material Choices) Gr.2 Titanium, 316 SS, porous Teflon, Viton, EPDM, Kalrez, Nickel, Wood & Glass
Dimensions	Dependent upon user specifications
Weight	Approximately 0. 23 kg (0.5 lb)

For More Information

Learn more about how Honeywell's HB547 – Multi-Installation Sensor Cartridge are designed for high temperature, high pressure and harsh chemical applications, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

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Technical Information

Honeywell

HB546 – In-line & Submersible pH Electrode
Series HB
Specifications

70-82-03-56 July 2007

Overview

Honeywell's pH electrodes are used for applications with high temperatures and pressures in addition to low and high pH. The HB Series complements the other pH offerings – the Durafet and Meredian electrodes.

The **HB546** is**:**

- intended for threaded in-line and submersible operations
- rugged, versatile and simple to use
- compatible with most industrial transmitters and analyzers

Honeywell's HB Series of electrode mountings utilize the patented Axial Ion Path Reference Cell Technology.
The Axial Ion Path Technology:

- prevents sensor poisoning
- prevent internal leaks
- prevent internal plugging
- allows extreme temperature and pressure tolerance
- allows for long life in low and high pH applications

Description

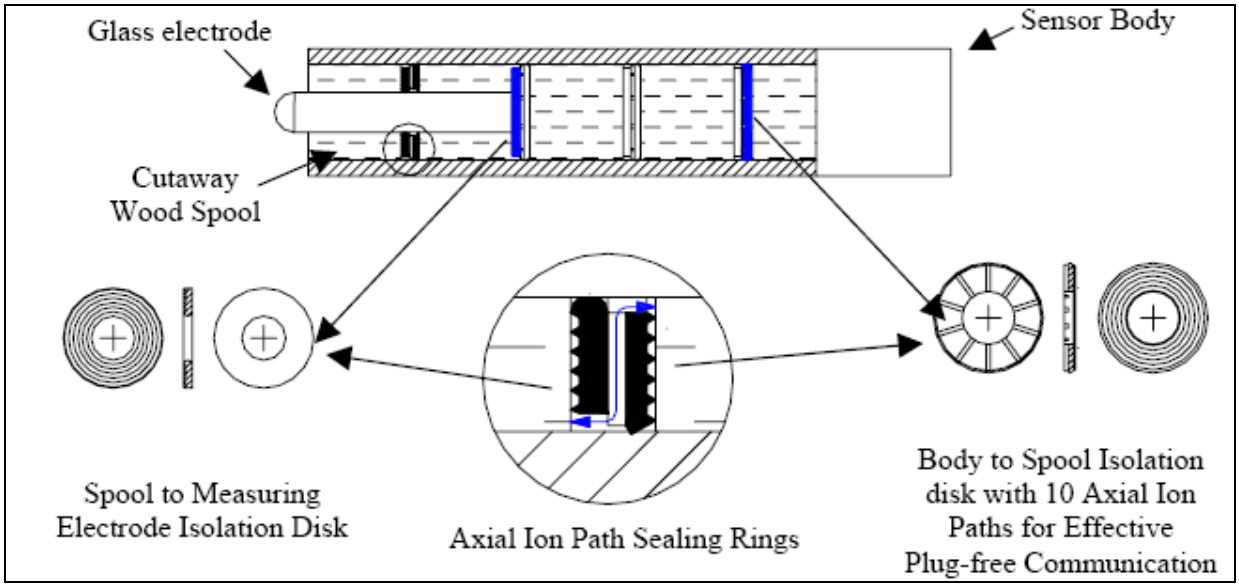
The **HB546** pH electrode offers a reliable combination of measuring and reference electrodes together with an integral automatic temperature compensator in a 1-piece corrosion resistant body (the body material is chosen by the customer).

The **HB546** pH electrodes with 3/4" NPT male connections are easily adapted for in-line mounting without O-rings or special seals. The electrodes are also available in Immersion and On-line mounting.

Axial Ion Path Reference

Like other rugged semi-solid state references, the reference is formed by a series of wood segments impregnated with KCL. The difference with the Axial Ion Path (A.I.P.) technology is where others utilize an epoxy or impermeable barrier between each of the wood segments; the A.I.P. uses a pair of formed discs.

When the two formed disc faces are positioned adjacent to one another they form an Axial Ion Path (filled with electrolyte) between each of the segments. The Axial Ion Path provides a more complete transition of KCl ions between the wood segments forward and creates a difficult and longer distance for poisons traveling back into the reference from the specimen fluid.



This is a porous surface, which passes ions between the reference and measurement fluid. The primary function is to allow very small amounts of KCl to leach from the reference and provide the millivolts necessary for pH measurement. The secondary function is to maintain a barrier between the measurement fluid and the reference so that the measurement fluid does not rapidly poison or foul the reference.

Temperature Compensator

This is typically a component (RTD, Resistor, Thermistor) that produces a proportional resistance to the temperature of a measured solution. The resistance is understood by the pH Transmitter/Indicator so it can make adjustment to the measurement slope to match the effect of temperature on the sensor. With conventional glass measuring electrodes the T.C. is typically located near the measurement bulb to reduce the time necessary to recognize the solution temperature.

The **HB546** allows the user to specify which temperature compensator is right for their instrument. The user has the following options:

- **Honeywell 8550 ohm**
- PT1000 RTD
- PT100 RTD Capillary. Hi-temp spec 125C
- PT1000 RTD Capillary, Hi-temp spec 125C

Features

HB546 Electrode

- Uses Axial Ion Path reference technology
- One electrode for entire pH and temperature ranges
- ***Suitable for in-line and submersion applications; may be mounted in any position***
- Integral automatic temperature compensator
- Chemically resistant CPVC, Kynar or Polypropylene body
- User can specify following:
  - Body Material
  - O-Ring Material
  - Measuring Electrode
  - Tip Configuration
  - Thermocompensation
  - Insertion Depth
  - Cable Configuration
  - Lead Terminations
- Great for high temperature and high pressure applications
- Can be used in both low and high pH conditions
- Rugged, quick-change, quick-clean
- Compatible with most industrial transmitters and analyzers

Specifications

Electrode	
Pressure and Temperature Rating	CPVC & Polypropylene: 100 psig, 100°C Kynar: 150 psig, 140°C (High Pressure Insertion System: 300 psig)
Operating Range	0-14 pH
Mounting	Threaded in-line: 3/4" MNPT threaded nose for installation into process, sample line or automatic cleaning system. Insertion depth user specifiable Submerged: 3/4" MNPT threaded top for connection to 3/4" FNPT coupling and extension pipe Ball-valve insertion: High-pressure insertion system, 1-1/4” or 1-1/2” full port valve *See Accessories in Module Selection Guide*
Wetted Materials	Kynar, CPVC, Polypropylene (Body Material Choices) Gr.2 Titanium, 316 SS, porous Teflon, Viton, EPDM, Kalrez, Nickel, Wood & Glass
Dimensions	Dependent upon user specifications
Weight	Approximately 0. 23 kg (0.5 lb)

For More Information

Learn more about how Honeywell's HB546 – In-line & Submersible pH Electrodes are designed for high temperature, high pressure and harsh chemical applications, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

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Honeywell

HB551 – Quick Change pH Sensor
Series HB
Specifications

70-82-03-57 July 2007

Overview

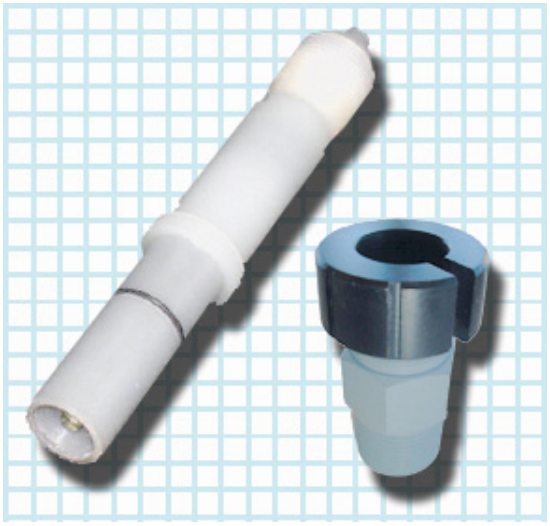
Honeywell's pH electrodes for applications with high temperatures and pressures in addition to low and high pH. The HB Series complements the other pH offerings – the Durafet and Meredian electrodes.

The **HB551** is:

- a quick change pH sensor
- a pH sensor with an external nut-loc that improves safety and makes replacement easy
- ideal for sample lines and valve side-streams
- rugged, versatile and simple to use
- compatible with most industrial transmitters and analyzers

Honeywell's HB Series of electrode mountings utilize the patented Axial Ion Path Reference Cell Technology. The Axial Ion Path Technology:

- prevents sensor poisoning
- prevent internal leaks
- prevent internal plugging
- allows extreme temperature and pressure tolerance
- allows for long life in low and high pH applications



HB551 Electrode and Fitting

The HB551 pH electrode is a quick change sensor.

Description

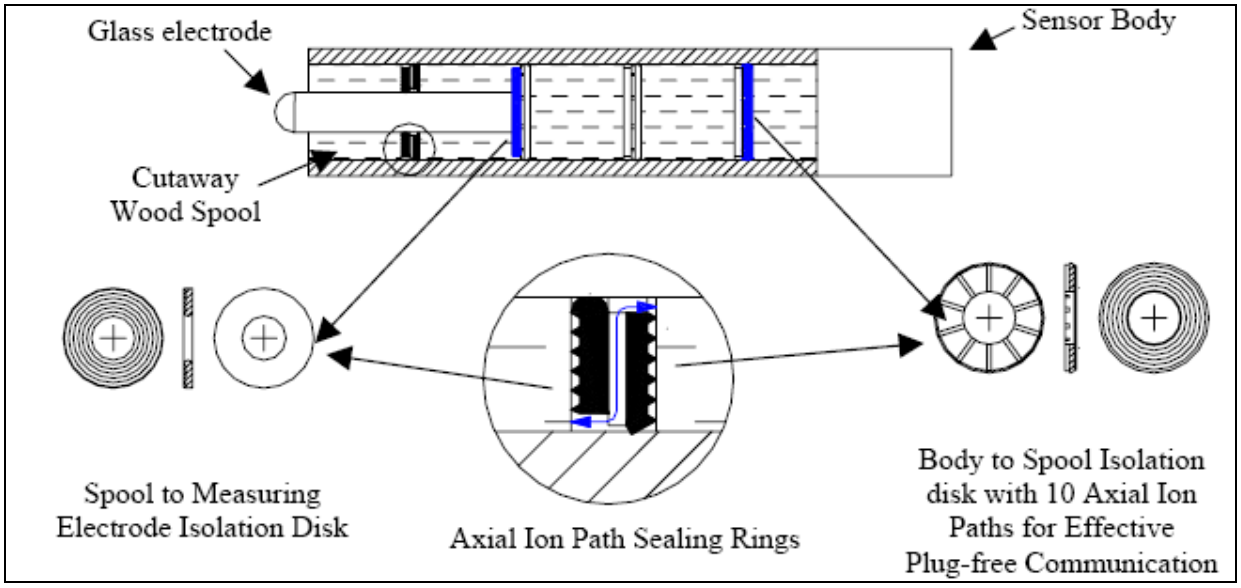
The **HB551** pH electrode offers a reliable combination of measuring and reference electrodes together with an integral automatic temperature compensator in a 1-piece corrosion resistant body (the body material is chosen by the customer).

The **HB551** pH electrodes are designed for quick-change in-line installations. The **HB551** can also be used in submersion operations.

Axial Ion Path Reference

Like other rugged semi-solid state references, the reference is formed by a series of wood segments impregnated with KCL. The difference with the Axial Ion Path (A.I.P.) technology is where others utilize an epoxy or impermeable barrier between each of the wood segments; the A.I.P. uses a pair of formed discs.

When the two formed disc faces are positioned adjacent to one another they form an Axial Ion Path (filled with electrolyte) between each of the segments. The Axial Ion Path provides a more complete transition of KCl ions between the wood segments forward and creates a difficult and longer distance for poisons traveling back into the reference from the specimen fluid.



This is a porous surface, which passes ions between the reference and measurement fluid. The primary function is to allow very small amounts of KCl to leach from the reference and provide the millivolts necessary for pH measurement. The secondary function is to maintain a barrier between the measurement fluid and the reference so that the measurement fluid does not rapidly poison or foul the reference.

Temperature Compensator

This is typically a component (RTD, Resistor, Thermistor) that produces a proportional resistance to the temperature of a measured solution. The resistance is understood by the pH Transmitter/Indicator so it can make adjustment to the measurement slope to match the effect of temperature on the sensor. With conventional glass measuring electrodes the T.C. is typically located near the measurement bulb to reduce the time necessary to recognize the solution temperature.

The **HB551** allows the user to specify which temperature compensator is right for their instrument. The user has the following options:

- **Honeywell 8550 ohm**
- PT1000 RTD
- PT100 RTD Capillary. Hi-temp spec 125C
- PT1000 RTD Capillary, Hi-temp spec 125C

Features

HB551 Electrode

- Uses Axial Ion Path reference technology
- One electrode for entire pH and temperature ranges
- ***Intended for quick-change in-line applications***
- ***Ideal for sample lines and valve side-streams***
- Integral automatic temperature compensator
- Chemically resistant CPVC, Kynar or Polypropylene body
- User can specify following:
  - Body Material
  - O-Ring Material
  - Measuring Electrode
  - Tip Configuration
  - Thermocompensation
  - Insertion Depth
  - Cable Configuration
  - Lead Terminations
- Great for high temperature and high pressure applications
- Can be used in both low and high pH conditions
- Utilizes an external nut-loc to improve safety
- Compatible with most industrial transmitters and analyzers

Specifications

Electrode	
Pressure and Temperature Rating	CPVC & Polypropylene: 100 psig, 100°C Kynar: 150 psig, 140°C
Operating Range	0-14 pH
Mounting	Quick-change in-line: 1” MNPT threaded adapter for installation into process, sample line or automatic cleaning system. Nut-loc retainer for quick removal and replacement. Submerged: 3/4" MNPT threaded top for connection to 3/4" FNPT coupling and extension pipe. *See Accessories in Module Selection Guide*
Wetted Materials	Kynar, CPVC, Polypropylene (Body Material Choices) Gr.2 Titanium, 316 SS, porous Teflon, Viton, EPDM, Kalrez, Nickel, Wood & Glass
Dimensions	Dependent upon user specifications
Weight	Approximately 0. 23 kg (0.5 lb)

For More Information

Learn more about how Honeywell's HB551 – Quick Change pH Sensors are designed for high temperature, high pressure and harsh chemical applications, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

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Honeywell

2-Wire pH Transmitters Series APT2000 Specifications

70-82-03-32 December 2010

Overview

The Honeywell Analytical Process Transmitter (APT) 2000 Series transmitter is a two-wire 24-Volt device that continuously measures pH or ORP in industrial processes including chemical, pharmaceutical, petrochemical, pulp and paper, and wastewater.

The APT2000's NEMA 4x and IP65 rated enclosure is specifically designed to meet the measurement needs of intrinsically safe, non-incendive and general-purpose areas. Honeywell pH or ORP sensors or a wide variety of competitor electrodes can be used as input to the transmitter. A 4-20 mA output is standard on the APT2000. For bi-directional remote monitoring/control of the process, the Hart communications protocol is available as an option.

Description

The Honeywell APT2000 series of transmitters offer the widest available selection of advanced features in a reliable and economical instrument.

Reliability First

The advanced features of the APT2000 transmitter guarantee complete reliability. The APT2000 continuously monitors sensor and transmitter electronics and immediately displays diagnostic information at the onset of a problem. If an error or diagnostic is found, the transmitter will indicate the appropriate error code or pictograph (see Figure 2), blink a red LED and adjust the error current to 22 mA if desired. A manual loop-back check is available to test the integrity of the 4-20mA output.

Quick Problem Assessment

The APT2000 has a large front display for quick recognition of process parameters and diagnostics even at a distance. Only the APT2000 employs visual feedback to quicken setup and maintenance times and to minimize errors made during calibrations.

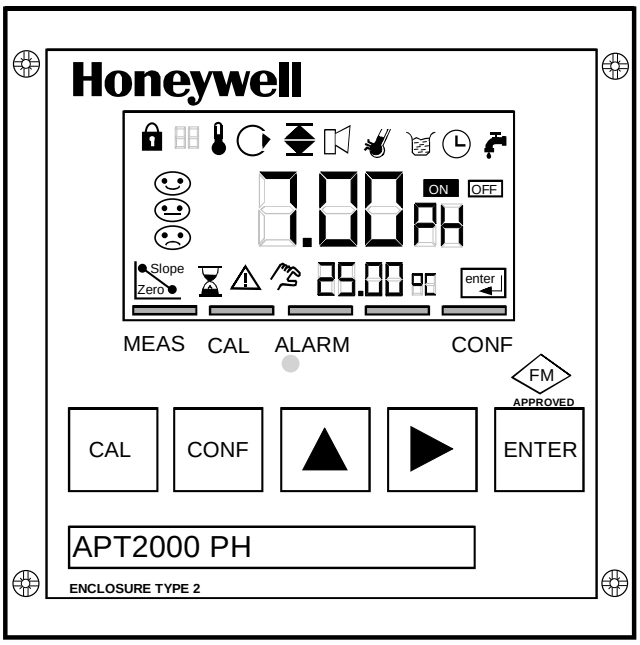

Figure 1 APT2000 Transmitter

Visual feedback refers to pictograph type characters that appear on the display both to prompt and respond to operator and process changes. Pictograph type characters also appear during problem conditions to report diagnostics for easy trouble-shooting. There is even a Sensoface® pictograph that provides constant feedback to the operator on whether or not there is a problem with the sensor. These easily learned and recognized symbols make the APT2000 an easy-to-use instrument in any language.

Foolproof Calibrations

Calibration is easy with automatic buffer recognition, utilizing a variety of buffer standards recognized worldwide. Foolproof calibrations are ensured with special on-board diagnostics that monitor the step-by-step progress of each calibration. Simple messages with pictographs provide feedback on the status of the calibration. Manual one or two-point calibrations can also be performed for complete flexibility.

Works with a Variety of Electrodes

Input to the APT2000 Series includes the Honeywell Durafet II non-glass pH electrode (with the Honeywell cap adapter cable or adapter module), Meredian II glass pH electrodes, or metallic ORP electrodes. In addition, a wide variety of other manufacturers' pH and ORP electrodes can be used with the APT2000.

Fully Certified

Area certifications for the APT2000 include both intrinsically safe and non-incendive ratings from FM and ATEX. Each transmitter comes standard with CE.

Easily Integrated

The APT2000 Series transmitters can be continuously remote controlled via HART communications from a handheld terminal or the control room. This option enables additional visibility and control of your process.

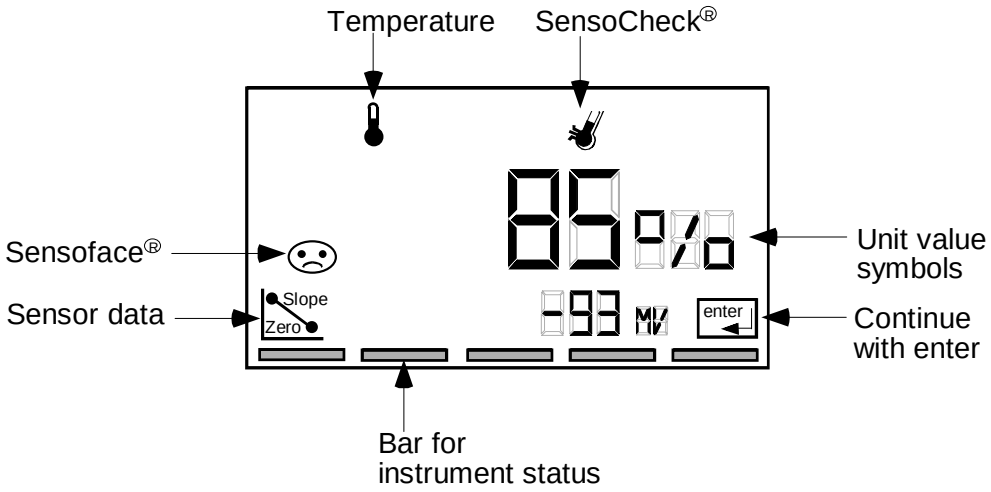

Figure 2 Example of Electrode Error -- Input Problem

Features

- pH measurement with Durafet II or glass pH electrodes
- Large display with easy-to-read 0.75 inch measured value
- Simple operator interface with basic pictographs
- Application in hazardous and safe areas
- HART bi-directional communications protocol
- Continuous diagnostics for monitoring calibration, probe health, and transmitter self-test
- Manual loopback check for integrity of 4-20 mA output
- Robust, tightly sealed plastic enclosure
- Wall, pipe or panel mounting
- Easy installation with pre-assembled empty enclosure and plug-in terminals
- Optical alarm signaling by blinking red LED
- Integrated current source for simple checking of peripheral devices

Applications

The APT2000 pH transmitter is designed to meet the measurement needs of a number of industries, including:

- Chemical
- Pharmaceutical
- Petrochemical
- Pulp and Paper
- Wastewater
- Power

Specifications

pH/mV Input	
Ranges	pH value: 0.00 to +14.00 pH ORP value: -1500 to +1500 mV
Electrode input types (Internal Preamplifier)	Honeywell Durafet II Electrodes with Cap Adapter Honeywell Meredian I/II Glass pH and Metallic ORP Electrodes Other Manufacturer's Electrodes (Consult factory for applicability)
Maximum cable length	Glass electrode: 6.1 m (20 feet) (Honeywell electrodes) Durafet II electrode: 305 m (1000 feet) with junction box ORP electrode: 15.25 m (50 feet) (Honeywell electrodes) with junction box
Accuracy	pH: <0.02 T_c: 0.0021 pH/K mV: <1 mV T_c: 0.1 mV/K
Electrode Diagnostics	
Sensocheck	Continuous monitoring of glass and reference electrodes (not available with Durafet II)
Sensoface	- Provides information on the electrode state via Sensocheck - Monitors asymmetry potential, slope, and response time during calibration
Electrode Calibration	
Operating Modes	- Automatic calibration with the buffer sets: -00- Knick 2.00 / 4.01 / 7.00 / 9.21 -01- Mettler Toledo 2.00 / 4.01 / 7.00 / 9.21 -02- Merck/Riedel de Haen 2.00 / 4.00 / 7.00 / 9.00 / 12.00 -03- Ciba (94) 2.06 / 4.00 / 7.00 / 10.00 -04- Tech. Buffers NIST 1.68 / 4.00 / 7.00 / 10.01 / 12.46 -05- Standard buffers NIST 4.006 / 6.865 / 9.180 -06- Hach buffers 4.00 / 7.00 / 10.18 - Manual input of individual buffer values
Calibration Timer	0 to 9999 hours
Calibration ranges	Asymmetry potential: ± 60 mV Slope: 80 to 103 %
Nominal Zero	Valid range: ± 200 mV Valid pH-range: 6.5…7.5 pH (without automatic temperature correction)
Temperature Input	
Range	Pt100/1000 Ω RTD: -20.0 to +150.0 °C / -4 to +302 °F 8550 Ω Thermistor: -10.0 to +110.0 °C / +14 to +230 °F
Resolution	0.1 °C or 1 °F
Accuracy	± 0.5 °C
Temperature Compensation	Automatic Nernstian Compensation using Pt100 Ω, Pt1000 Ω, 8550 Ω or manual
Display	LCD display 76 mm x 48 mm dimensions (3" x 1 7/8"), 7-segment pH/mV Value: character height 17 mm (.66") , meas. symbol 10 mm (.4") Temperature: character height 10 mm (.4"), meas. symbol 7 mm (.33") Sensoface with three states, 5 status bars, 16 pictographs / symbols, Red Alarm LED Security protection with four-digit mode codes to access calibration and configuration options

Supply/Output	
Output current	4 to 20 mA (22 mA for error notification) current loop, floating (3.8 to 20.5 mA)
Supply voltage	12 to 42 V; I_{max} = 100 mA; P_{max} = 0.8 W
Overrange	22 mA for error messages
Current error	<0.3 % of current value +0.05 mA
Beginning/end of scale	Configurable within measurement range for pH or mV
Minimum span	pH value: 2.00 to 14.00 pH mV value: 200 to 3,000 mV
Durafet II Cap Adapter Power Supply Output	+3V / 0.5 mA -3.5V / 0.4 mA
Current source	3.80 to 22.0 mA

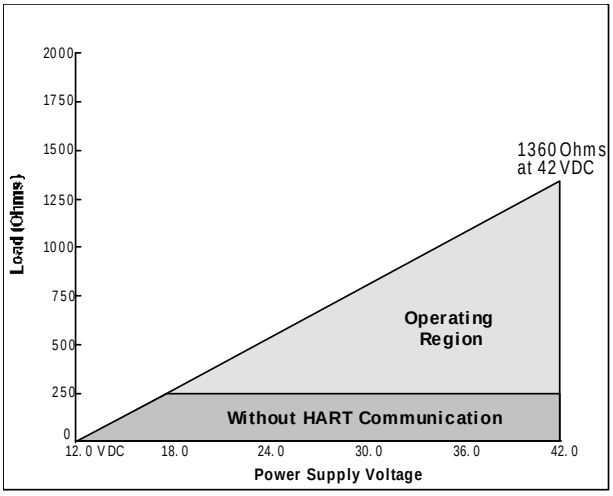

Figure 3 Load/Power Supply Requirements

Communications	
HART Protocol	• Digital communication via FSK modulation of the loop current • Point-to-point connection • Reading of measured values, status, messages, and multidrop unit identification • Read and write parameters
Physical	
Enclosure	Plastic enclosure made of PBT (polybutylene terephthalate) bluish-gray RAL 7031
Mounting	Wall, Pipe, or Panel Mount
Dimensions	H 144 mm, W 144 mm, D 105 mm (H 5.67", W 5.67", D 4.13")
Protection	NEMA 4x, IP65
Cable glands	3 breakthroughs for Pg 13.5 2 breakthroughs for NPT 1/2" or Rigid metallic conduit
Weight	Approx. 1 kg (2.2 lbs)

Area Certifications / Compliances	
Non-Incendive	Zone 2 (USA) FM: NI, Class I, Div 2, Groups A – D, T4
Intrinsically Safe	Zone 1 (USA) FM: IS, Class I, Div 1, Groups A – D, T4 Zone 1 (Europe) ATEX: II 2G EEx ib [ia] IIC T6
Data Retention	Parameters and calibration data > 10 years (EEPROM)
RFI Suppression / Immunity to ESD	To EN 50 081-1 and EN 50 081-2
Ambient Conditions	Operation/Environmental temp: (T4) -20 to +55 °C (-4 to +131 °F) (T6) -20 to +40°C (-4 to +104 °F) Transport and Storage temp: -20 to +70 °C (-4 to +158 °F)

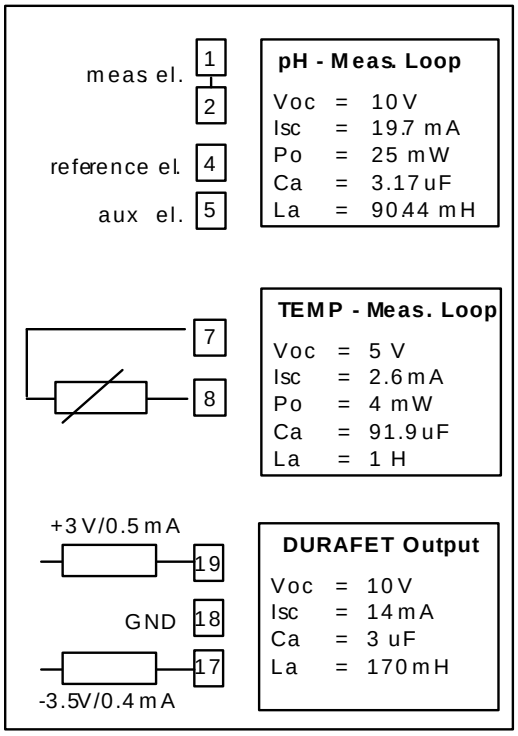

Figure 4 Entity Parameters

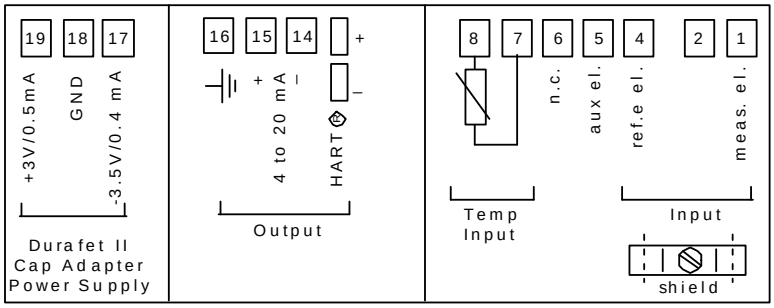

Figure 5 APT2000 pH Terminal Assignments

Model Selection Guide

Instructions

- APT2000 Transmitter Offers:
  - Power Requirements - 2 Wire, 14 to 42 VDC
  - Standard - All models CE Compliant
  - Standard - NEMA 4X, IP65
  - Optional - Three mounting types: (must be ordered separately)
    1. Panel Mount Kit
    2. Pipe/Wall Mount Kit
    3. Protective Hood (requires Pipe/Wall Mount Kit)
  - Optional - HART communications
  - Approval Options:
    1. Non - Incendive: also FM Class I, Div 2, Groups A-D
    2. Intrinsically Safe: I FM Class I, Div 1, Groups A-D
       ATEX EEx ib [ia] 11C T6/T4

- Select the desired key number. The arrow to the right marks the selection available.
- Make one selection from Tables using the column below the proper arrow.
  A dot (•) denotes unrestricted availability.

Key Number _ _ _ _ _ _ _ _ _ - I _ - II _ _ - III _ _ _

KEY NUMBER Description of Measurement Type	Selection	Availability ↓	↓	↓
pH/ORP	APT 2000 PH			
Toroidal (Electrodeless) Conductivity	APT 2000 TC			
Contacting Conductivity	APT 2000 CC			

TABLE I - Communications Protocol

None (Analog 4 - 20 mA only)	0	•	•	•
HART Protocol	H	•	•	•

TABLE II - Approvals

Non - Incendive: also FM Class I, Div 2, Groups A-D	00	•	•	•
Intrinsically Safe: FM Class I, Div 1, Groups A-D ATEX EEx ib [ia] IIC T6/T4	IS	•		•

TABLE III - Optional Equipment

User's Manual	English	E _ _	•	•	•
Future		_ 0 _	•	•	•
Future		_ _ 0	•	•	•

Accessory Parts	Part Number
Mounting Kits:	
Panel Mounting Kit	51205990-001
Pipe/Wall Mounting Kit	51205988-001
Protective Hood (requires pipe/wall kit)	51205989-001
HART Test Socket	51205991-001
Instruction Manual - pH	70-82-25-92
Instruction Manual - Toroidal (Electrodeless) Conductivity	70-82-25-96
Instruction Manual - Contacting Conductivity	70-82-25-95

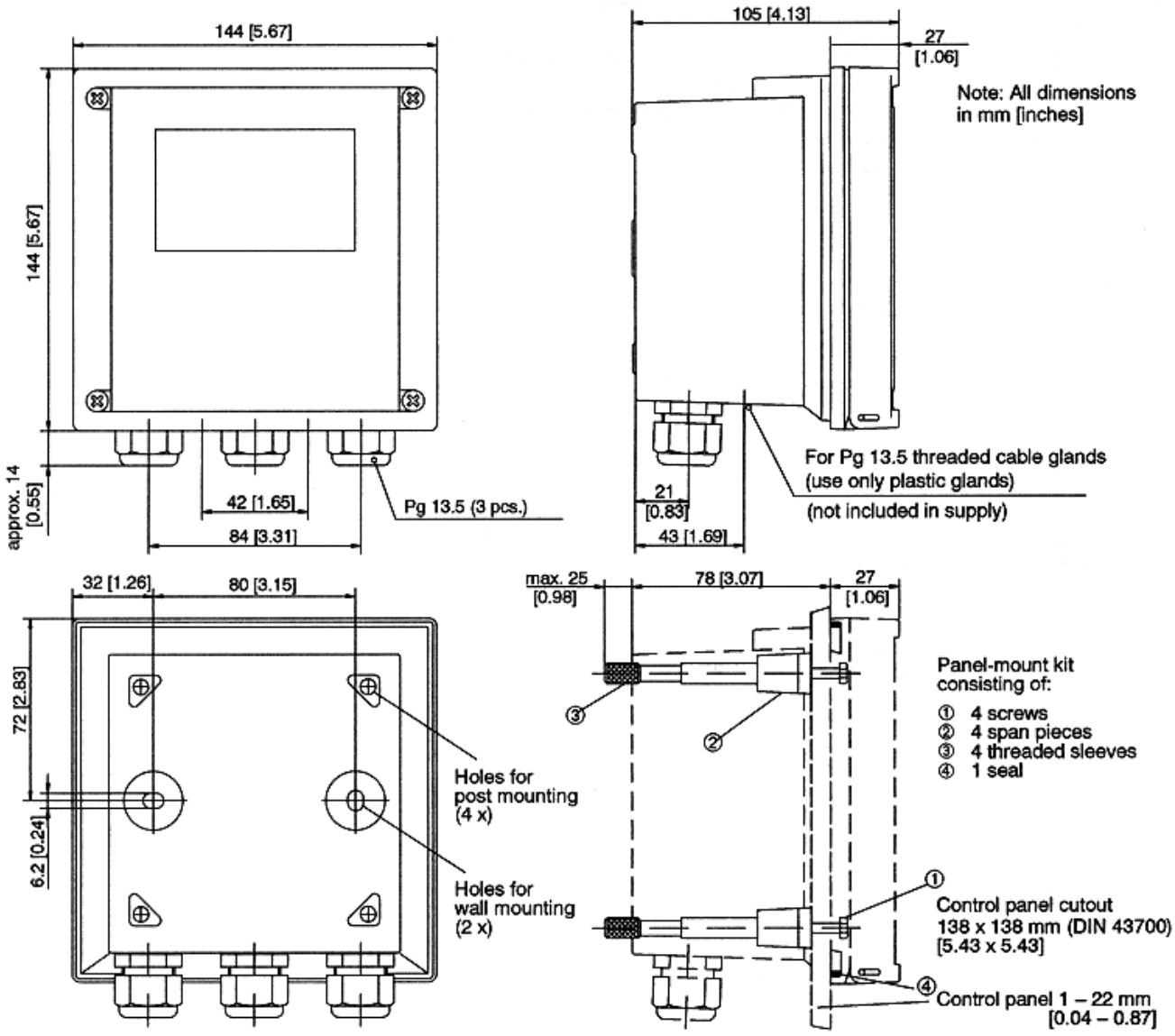

Figure 6 Dimension Drawing for APT2000 and P/N 51205990-001 panel mounting kit

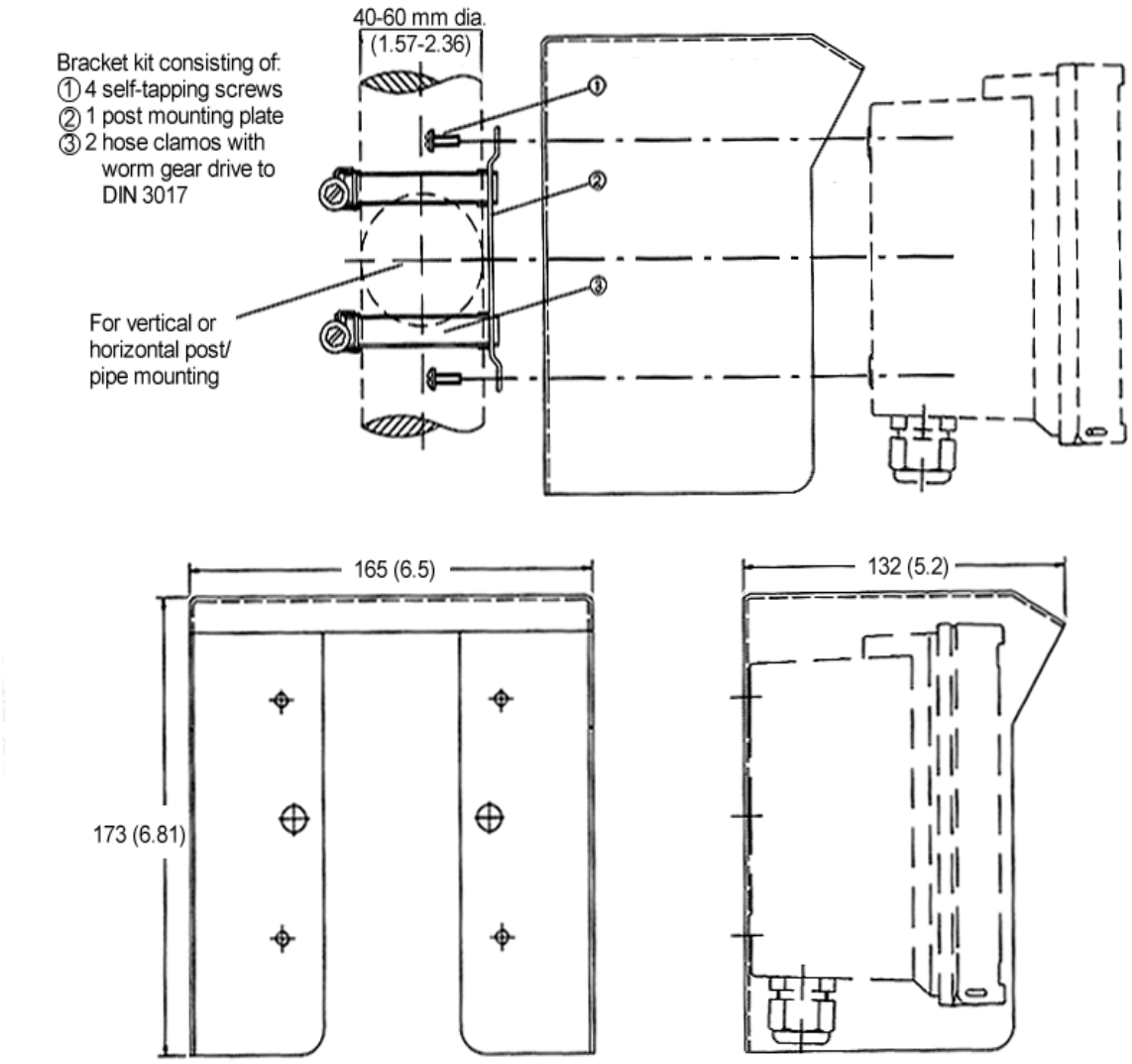
40-60 mm dia.
(1.57-2.36)
Bracket kit consisting of:
① 4 self-tapping screws
② 1 post mounting plate
③ 2 hose clamos with worm gear drive to DIN 3017
For vertical or horizontal post/ pipe mounting
165 (6.5)
132 (5.2)
173 (6.81)

Figure 7 Dimension Drawing for APT2000 with Wall or Pipe Mounting

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose**. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For More Information

Learn more about how Honeywell's 2-Wire pH Transmitters can be used for measurement needs of intrinsically safe, non-incendive and general-purpose areas, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

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4-Wire pH Analyzers Series APT4000 Specifications

70-82-03-44 October 2003

Overview

The Honeywell Analytical Process Analyzer (APT) 4000 Series 2 continuously measures pH or ORP in industrial processes including chemical, pharmaceutical, petrochemical, pulp and paper, and wastewater.

The APT4000's NEMA 4X/IP65-rated enclosure is specifically designed to meet the measurement needs of Class I, Division 2 (non-incendive) and general-purpose areas. The analyzer can be used with Honeywell pH or ORP sensors, or a wide variety of compatible electrodes. The analyzer has a universal (20-253 V ac/dc, 45-65 Hz) power supply with two 4-20 mA outputs, high/low alarm relays, and an extra relay which can be designated for diagnostic or wash capabilities.

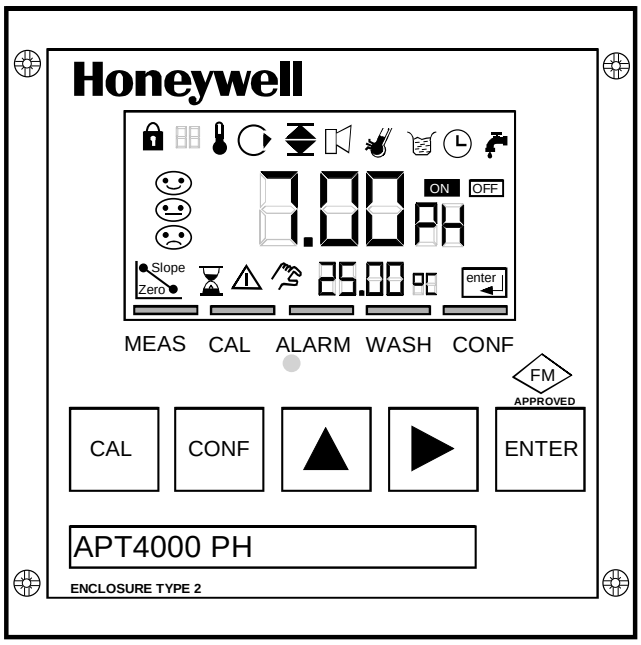

Figure 1 — APT4000PH Analyzer

Description

The Honeywell APT4000 series of analyzers offers the widest available selection of advanced features in a reliable and economical instrument.

Reliability First

The advanced features of the APT4000 Series 2 analyzer guarantee complete reliability. The APT4000 continuously monitors sensor and analyzer electronics and immediately displays diagnostic information at the onset of a problem. If an error or diagnostic is found, the analyzer will indicate the appropriate error code or pictograph (see Figure 2), blink a red LED and adjust the error current to 22 mA if desired. A manual loop-back check is available to test the integrity of the 4-20 mA output.

Quick Problem Assessment

The APT4000 has a large front display for quick recognition of process parameters and diagnostics even at a distance. Only the APT4000 employs *visual feedback* to quicken setup and maintenance times and to minimize errors made during calibrations. Visual feedback refers to pictograph type characters that appear on the display both to prompt and respond to operator and process changes.

Pictograph type characters also appear during problem conditions to report diagnostics for easy troubleshooting. There is even a Sensoface® pictograph that provides constant feedback to the operator on whether or not there is a problem with the sensor. These easily learned and recognized symbols make the APT4000 an easy-to-use instrument in any language.

Foolproof Calibrations

Calibration is easy with automatic buffer recognition, utilizing a variety of buffer standards recognized world-wide. Foolproof calibrations are ensured with special on-board diagnostics that monitor the step-by-step progress of each calibration. Simple messages with pictographs provide feedback on the status of the calibration. Manual one- or two-point calibrations can also be performed for complete flexibility.

Works with a Variety of Electrodes

The inputs to the APT4000 Series include the Honeywell Durafet® II non-glass pH electrode (with the Honeywell cap adapter cable), Meredian® II glass pH electrodes, or Meredian II metallic ORP electrodes. In addition, a wide variety of other manufacturers' pH and ORP electrodes can be used with the APT4000.

Fully Certified

Area certification for the ATP4000 is FM Class I, Div. 2, Groups A-D (non-incendive). Each analyzer comes standard with CE.

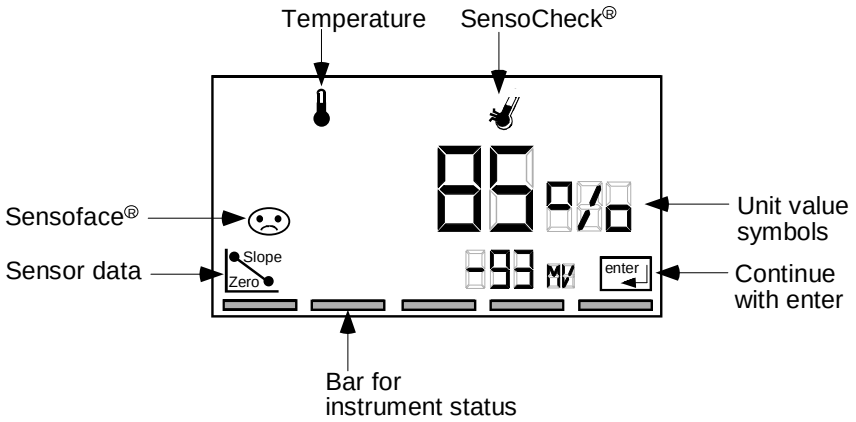

Figure 2 — Example of Electrode Error – Input Problem

Features

- pH measurement with Durafet II ORP or glass pH electrodes
- Large display with easy-to-read 0.75 inch measured value
- Simple operator interface with basic pictographs
- Application in Class I, Division 2 or General Purpose areas
- Continuous diagnostics for monitoring calibration, probe health, and analyzer self-test
- 2nd Parameter Set programmable for alternative applications
- 2nd 4-20mA output for re-transmission of process temperature
- NEMA 4X, IP65 plastic enclosure
- Manual loopback check for integrity of 4-20 mA output
- Wall, pipe or panel mounting
- Easy installation with pre-assembled empty enclosure and plug-in terminals
- Optical alarm with relay contact
- Dedicated high/low alarm relays
- PID Control Pulse Length / Pulse Frequency.
- Last Error Display
- Error messaging – Flashing Symbols and Fault Codes

Applications

The APT4000 pH analyzer is designed to meet the measurement needs of a number of industries, including:

- Chemical
- Pharmaceutical
- Pulp and Paper
- Wastewater
- Power

Specifications

pH/mV Input	
Ranges	*pH value:* 0.00 pH to +14.00 pH *ORP value:* –1500 mV to +1500 mV
Electrode Input Types (internal preamplifier)	Honeywell Durafet II Electrodes **with Cap Adapter** Honeywell Meredian I/II Glass pH and Metallic ORP Electrodes Other Manufacturers' Electrodes (Consult factory for applicability)
Maximum Cable Length	*Glass electrode:* 6.1 m (20 feet) (Honeywell electrodes) *Durafet II electrode:* 305 m (1000 feet) with junction box *ORP electrode:* 15.25 m (50 feet) (Honeywell electrodes) with junction box
Accuracy	*pH*: < 0.02 *Tc: 0.0021 pH/K* *mV:* < 1 mV *Tc: 0.1 mV/K*
Electrode Diagnostics	
Sensocheck	Continuous monitoring of glass and reference electrodes (not available with Durafet II)
Sensoface	-Provides information on the electrode state via Sensocheck -Monitors asymmetry potential, slope, and response time during calibration
Electrode Calibration	
Operating Modes	- Automatic calibration with the buffer sets: - 00- Knick 2.00 / 4.01 / 7.00 / 9.21 - 01- Mettler Toledo 2.00 / 4.01 / 7.00 / 9.21 - 02- Merck/Riedel de Haen 2.00 / 4.00 / 7.00 / 9.00 / 12.00 - 03- Ciba (94) 2.06 / 4.00 / 7.00 / 10.00 - 04- Tech. Buffers NIST 1.68 / 4.00 / 7.00 / 10.01 / 12.46 - 05- Standard buffers NIST 4.006 / 6.865 / 9.180 - 06- Hach buffers 4.00 / 7.00 / 10.18 - Manual input of individual buffer values
Calibration Timer	0 to 9999 hours
Calibration Ranges	*Asymmetry potential:* ± 60 mV *Slope:* 80 % to 103 %
Nominal Zero	*Valid range:* ± 200 mV *Valid pH-range:* 6.5…7.5 pH (without automatic temperature correction)
Temperature Input	
Range	*Pt100/1000 Ω RTD:* –20.0 °C to +150.0 °C (–4 °F to +302 °F) *8550 Ω Thermistor:* –10.0 °C to +110.0 °C (+14 °F to +230 °F)
Resolution	0.1 °C or 1 °F
Accuracy	± 0.5 °C
Temperature Compensation	Automatic Nernstian Compensation using Pt100 Ω, Pt1000 Ω, 8550 Ω or manual
Display	LCD display 76 mm x 48 mm (3" x 1-7/8") dimensions, 7-segment *pH/mV Value:* character height 17 mm (0.66") , meas. symbol 10 mm (0.4") *Temperature*: character height 10 mm (0.4"), meas. symbol 7 mm (0.33") Sensoface with three states, 5 status bars, 16 pictographs / symbols, Red Alarm LED Security protection with four-digit mode codes to access calibration and configuration options

Supply/Output	
Output Current	0 mA or 4 mA to 20 mA current loop, 10 V floating Output #1 for pH, Output #2 for Temperature
Supply Voltage	20 V to 253 V ac/dc, 45 Hz to 65 Hz, 2 VA / 1.5 W
Overrange	22 mA for error messages
Current Error	< 0.3 % of current value +0.05 mA
Beginning/End of Scale	Configurable within measurement range for pH or mV
Minimum Span	*pH value:* 2.00 pH to 14.00 pH *mV value:* 200 mV to 3,000 mV
Durafet II Cap Adapter Power Supply Output	+3 V / 0.5 mA –3.5 V / 0.4 mA
Current Source	3.80 mA to 22.0 mA
PID Function	Relay assignable for PID Control Pulse Length / Pulse Frequency.
Alarms/Relays	
Contacts	*Alarm minimum contact:* SPST N/O *Alarm maximum contact:* SPST N/O *Diagnostic contact:* SPST N/C *Wash contact:* SPST N/O *Hysteresis Limit Contacts:* 0.1 pH or 5 mV
Loadability (resistive)	*AC:* < 250 V / < 3A / < 750 VA *DC:* < 120 V/ < 3A / < 90 W
Physical	
Enclosure	Plastic enclosure made of PBT (polybutylene terephthalate) bluish-gray RAL 7031
Mounting	Wall, Pipe, or Panel Mount
Dimensions	*Height:* 144 mm (5.67") *Width:* 144 mm (5.67") *Depth:* 105 mm (4.13")
Protection	NEMA 4X, IP65
Cable glands	3 breakthroughs for PG 13.5 2 breakthroughs for NPT 1/2” or Rigid metallic conduit
Weight	Approximately 1 kg (2.2 lb.)
Area Certifications / Compliances	
Area Certification	Zone 2 (USA) FM: NI, Class I, Div. 2, Groups A-D, T4
Data Retention	Parameters and calibration data > 10 years (EEPROM)
RFI Suppression / Immunity to ESD	To EN 50 081-1 and EN 50 081-2
Ambient Conditions	*Operation/Environmental temperature:* (T4) –20 °C to +55 °C (–4 °F to +131 °F) (T6) –20 °C to +40 °C (–4 °F to +104 °F) *Transport and Storage temperature:* –20 °C to +70 °C (–4 °F to +158 °F)

Model Selection Guide

Reference 51-52-16-73

Instructions

- APT4000 Analyzer Offers:
  - Power Requirements - Universal, 20 to 253V AC/DC 45 to 65 Hz
  - Standard - NEMA 4X, IP65
  - Standard Approvals:
    - General Purpose; also FM Class I, Div 2, Groups A-D
  - Standard - All models CE Compliant
  - High/Low Alarm Relays
  - Three mounting types: **(must be ordered separately)**
    - Panel Mount Kit
    - Pipe/Wall Mount Kit
    - Protective Hood (requires Pipe/Wall Mount Kit)

- Select the desired key number. The arrow to the right marks the selection available.
- Make one selection from Tables using the column below the proper arrow.
  A dot (•) denotes unrestricted availability.

Key Number _____ - **I** ___

KEY NUMBER Description of Measurement Type	Selection	Availability ↓	↓	↓
pH/ORP	APT 4000 PH	↓		
Toroidal (Electrodeless) Conductivity	APT 4000 TC		↓	
Contacting Conductivity	APT 4000 CC			↓

TABLE I - Optional Equipment

User's Manual	English	E _ _	•	•	•
Future		_ 0 _	•	•	•
Future		_ _ 0	•	•	•

NOTE: Mounting kit not included with APT4000.

Accessory Parts	Part Number
Mounting Kits:	
Panel Mounting Kit	51205990-001
Pipe/Wall Mounting Kit	51205988-001
Protective Hood (requires pipe/wall kit)	51205989-001
Instruction Manual - pH	70-82-25-103
Instruction Manual - Toroidal (Electrodeless) Conductivity	70-82-25-105
Instruction Manual - Contacting Conductivity	70-82-25-104

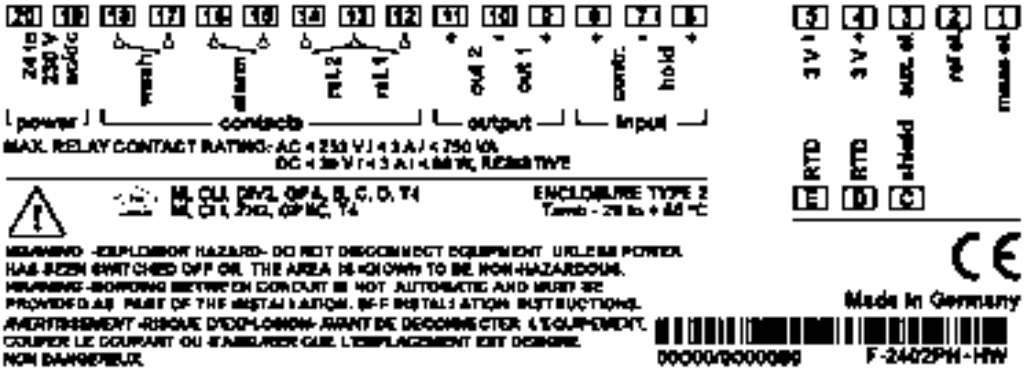

Figure 3 — APT4000PH Terminal Assignments

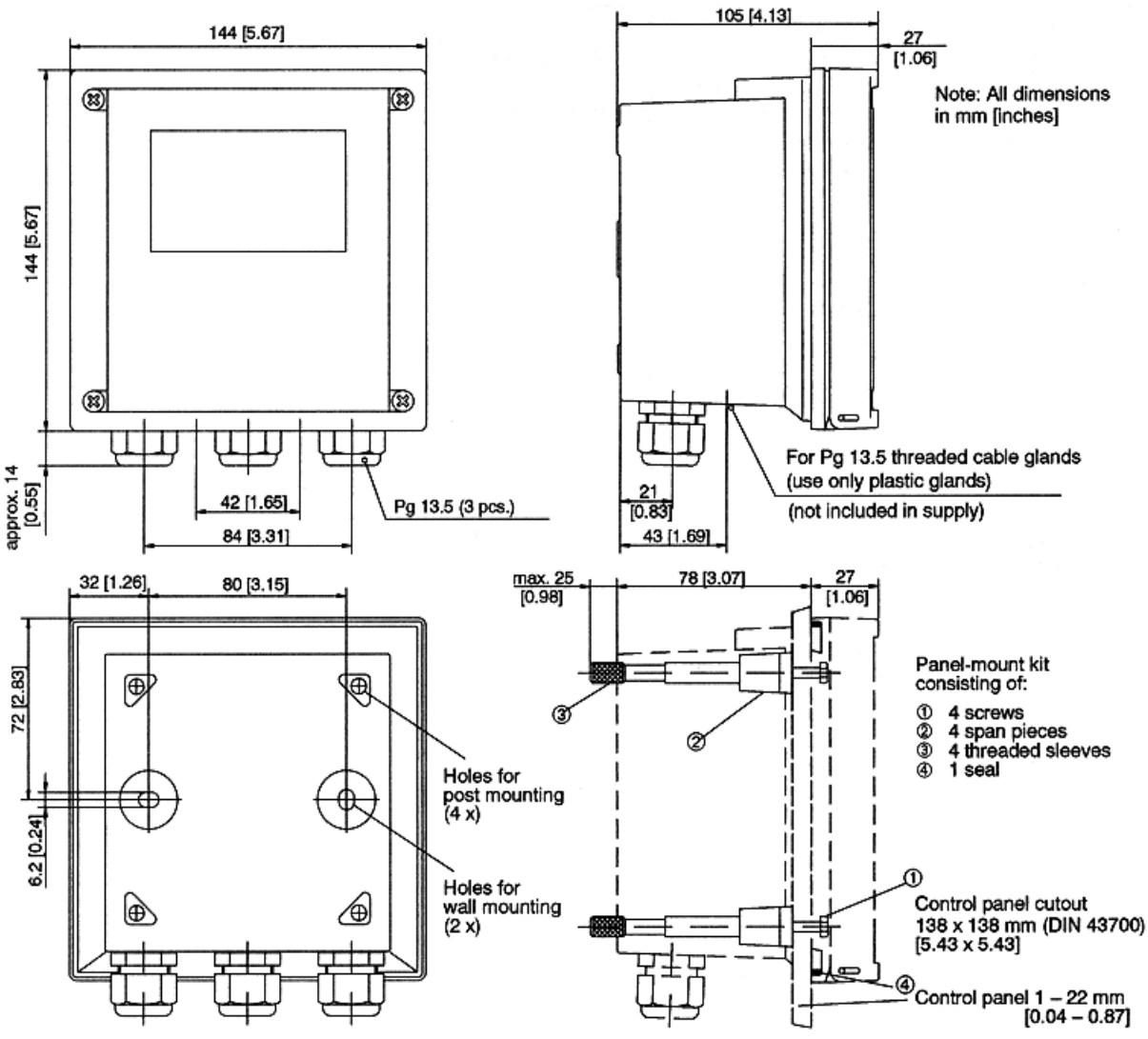

Figure 4 — Dimension Drawing for APT4000 and P/N 51205990-001 Panel Mounting Kit

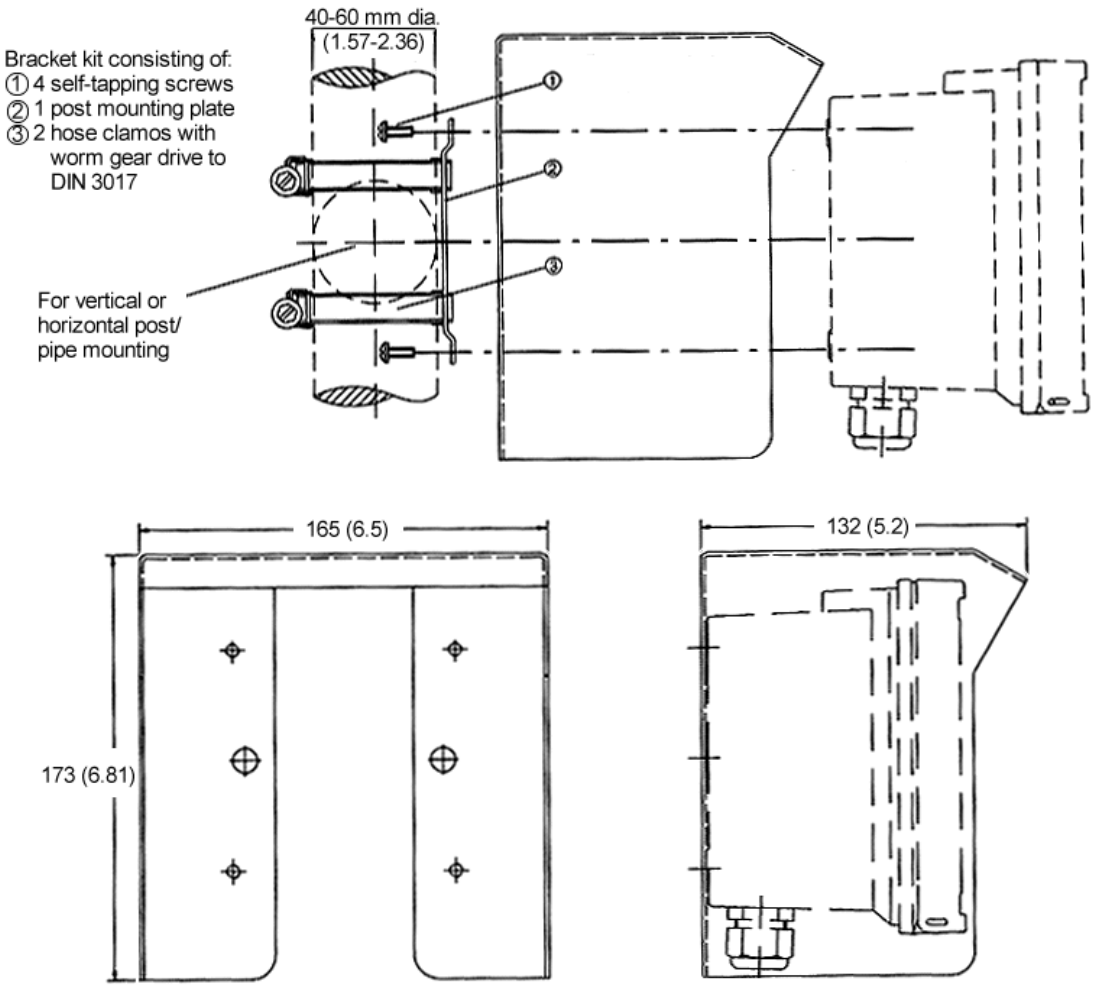

Figure 5 — Dimension Drawing for APT4000 with Wall or Pipe Mounting

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose**. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Durafet II and Meredian II are registered trademarks of Honeywell.

Sensoface is a registered trademark of Knick GmbH & Co. KG,

For More Information

Learn more about how Honeywell's 4-Wire pH Analyzers can offer the widest available selection of advanced features in a reliable and economical instrument, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

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Phoenix, Arizona 85027

Tel: 1-800-423-9883 or 1-800-343-0228

www.honeywell.com/ps

70-82-03-44
October 2003
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Technical Information

Honeywell

DL421/422 DirectLine Sensor for Durafet II and Meredian II pH/ORP Electrodes Specifications

70-82-03-40 January 2003

Overview

DirectLine® DL421/422 for Durafet® II pH and Meredian® II pH/ORP electrodes is a family of sensors released by Honeywell as part of a new generation of analytical measurement. The DirectLine sensor's unique architecture combines the latest in microelectronics technology with the proven performance of Durafet II solid state pH sensors, or Meredian II glass electrodes, to provide unequaled savings during installation, start-up, operation, and maintenance.

The DirectLine electronics module can mount integrally on the pH/ORP electrode and provide a 4-20 mA dc output proportional to pH. The output of the DirectLine sensor connects directly to any host monitor or control device that accepts standard 4-20 Ma.

Inputs and provides external loop power including:

- Honeywell UDC3300 1/4-DIN Controller
- UMC800 Controller
- PLCs with analog inputs
- DCS systems
- A host of recorder/controller products

For electrode submersion or special mounting applications, the electronics module is also available in a remote-mounting configuration.

Description

The Honeywell DirectLine architecture consists of an electronics module integral to the electrode. This design eliminates the need and added cost of a separate analyzer or transmitter.

The electronics module is sealed in a plastic weatherproof, corrosion-resistant housing and is connected to the pH/ORP electrode on one side and a 4 20 mA output cable on the other via waterproof connectors.

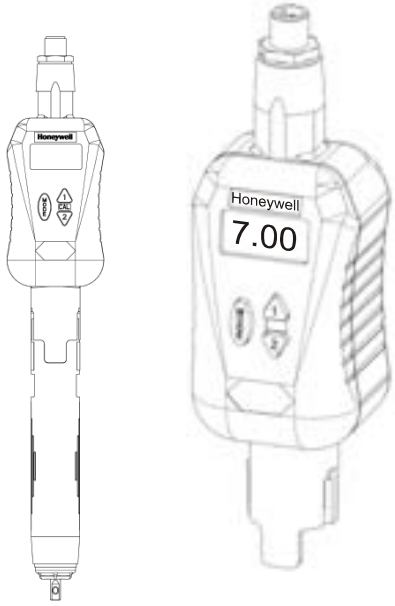


Figure 1 — DirectLine DL421 Sensor

This housing design allows this system to be used in harsh environments where moisture and dust is a problem. For submersion or special mounting applications, the remote mounting option connects the electronics module to the electrode via a cable. The electronics module is then mounted on a 2-inch pipe, wall, or DIN rail.

Features

- **Direct 4-20 mA output** eliminates need for dedicated analyzers or transmitters, simplifying installation, start-up, operation, and maintenance tasks. Installation costs are also reduced because standard cable can be used for additional cable distances
- **Integral electronics with local HMI** simplifies installation and shortens calibration times
- **Modular plug-in construction** simplifies electrode replacements
- **Local display and keypad** facilitates quick set-up, calibration, and operational activities
- **½" NPT conduit** connection provides increased protection and noise immunity of output cable
- **Plug-in modular design** allows sensor to be safely removed and replaced without cycling power on the electronics module
- **Electronics and sensor diagnostics** reduces troubleshooting times
- **Sample or auto buffer calibration options** accommodates individual calibration techniques and reduces calibration time
- **Playing card-sized guide** facilitates simple, correct, and consistent calibration and configuration
- **Watertight sensor connection** for reliability in submersion applications
- **Global approvals including:**
    - CE Mark for industrial applications
    - UL General Purpose
    - CSA General Purpose
    - FM Class I, Div. 1 (I.S.)
    - FM Class I, Div. 2 (non-incendive field wiring)
    - IP66, Type 4x Enclosure

Electronics Module

Integral Electronics/Sensor Design

The DirectLine electronics module is loop-powered by 16-42 Vdc source and will modulate its supply current from 4-20 mA, depending upon the pH or ORP value sensed by the electrode. The output cable connects to the electronics module by a waterproof connector. The DirectLine sensor's output cable connector is a standard M12 type receptacle.

The M12 receptacle easily connects to a cord set with an M12 connector or an M12 field wiring connector and customer-supplied cable.

The DL421/422 module quickly attaches to the electrode and is easily locked-in-place for assured safety and reliability during operation. The electrode can be removed from the module safely without disrupting power to the electronics.

Submersion Applications

For submersion or special wiring applications, a remote electronics module option is available. The remote electronics module is mounted on a 2-inch pipe, wall, or DIN rail. The remote sensor cable directly connects the electronics module to the sensor with a submersible connector. The remote sensor cable is available in 20-ft. or 50-ft. lengths for the Durafet II electrode, or in 12-ft. or 20-ft. lengths for the Meredian II pH/ORP electrode.

Operator Interface

The DirectLine electronics module configuration, calibration, and maintenance functions are performed locally from three buttons and a 4-digit, 7-segment LCD display on the front side of the electronics module. The process variable, temperature (if available), and any error diagnostics are viewable from the local LCD display.

The following configuration functions are available.

- Zero (Standardization) calibration
- Slope calibration (for pH only)
- Buffer group selection for Auto Buffer Recognition (for pH only)
- Solution temperature coefficient selection (for pH only)
- Output configuration
- Noise suppression frequency selection

The Honeywell DirectLine sensor eliminates the extra time needed to travel back and forth between the analyzer/transmitter and sensor while performing a calibration. The DL421 for pH offers two calibration options: Sample or Auto Buffer Recognition. In addition, you can elect to do a one or two-point calibration. Standard buffer tables are available in the software to help simplify and reduce your calibration setup time.

A playing card-sized guide comes with each DirectLine sensor to guide you through a configuration or calibration quickly.

Online Diagnostics

The DirectLine sensor continuously performs self-diagnostics on both the electronics and sensor. These prioritized self-diagnostics help to minimize the time and expense of troubleshooting during start-ups, maintenance, and calibrations.

If a problem arises with either the module electronics or the sensor, the software prioritizes the problem type and displays only the highest priority error diagnostic thus simplifying the troubleshooting process. Once the diagnostic is corrected, the error code disappears from the display.

If the electrode's temperature or process variable value goes out of operation range, the output current is driven to approximately 21.8 mA to inform the host device of a problem. Once the problem is corrected, the output current is returned back to normal and the error code disappears. Error codes are also used to indicate calibration failures.

For pH measurement a special zero offset and percent theoretical slope calibration diagnostic updates automatically at completion of each calibration. The operator can monitor these diagnostics to determine when the sensor is no longer capable of holding a good calibration.

Durafet Electrodes

Durafet II electrodes feature state-of-the-art pH measurement technology, using an ISFET (Ion Sensitive Field Effect Transistor) sensing element. This virtually unbreakable, industrial solid state pH electrode provides especially fast response for improved product quality. Durafet sensors produce a direct low impedance pH signal for outstanding reliability even at low temperatures and with no sodium error or ORP interference. The Durafet pH electrode incorporates a replaceable reference junction frit and gel, assuring long life even in the most highly fouling applications.

Features include:

- ISFET technology provides an exceptionally fast response for improved product quality.
- Virtually unbreakable for lower replacement costs.
- Reference junction frit and gel are replaceable for longer electrode life.
- Low impedance pH signal.
- Low impedance pH signal for improved product reliability.
- One electrode for entire pH and temperature ranges results in lower inventory costs.

Specifications

Displayed Process Variable	*pH:* 0-14 pH *ORP:* –1600 to +1600 mV
Displayed Temperature Range (pH only)	–10 °C to +110 °C (14 °F to 230 °F)
Display Accuracy (reference)	*pH:* ±0.02 pH *ORP:* ±1 mV
Process Temperature	*Durafet:* –10 °C to +110 °C (14 °F to 230 °F) *Meredian:* 0 °C to 110 °C (32 °F to 230 °F)
Durafet Sensor Survivable Temperature Range	–10 °C to +130 °C (14 °F to 266 °F)
Electronics Module Ambient Temperature	–20 °C to +85 °C (–4 °F to +185 °F)
Output Type	4-20 mA (2-wire loop powered)
Output Scale	0-14 pH, ±1600 mV
Output Calibration	4-20 mA
Durafet Remote Mating Connector Rating	Submersible to 20 feet
Output (Loop) Cable Connection	M12 type
User Termination	Tinned leads on cord set or customer supplied cable
Cable Lengths **Sensor:** **Output:**	 *Durafet:* 20 feet or 50 feet *Meredian:* 12 feet or 20 feet 20 feet or 50 feet
Power	16-42 Vdc *Maximum Load Resistance*: 250 ohms at 16 Vdc 600 ohms at 24 Vdc 1400 ohms at 42 Vdc
Local Display and Buttons	LCD 4-digit, 7-segment
Engineering Units	pH, mV degrees F degrees C
Calibration Options (pH)	1 point Sample or 2 point Sample Auto Buffer Recognition *Selections:* US, NIST, EURO
Solution Temperature Compensation (for pH only)	*Selections:* 0.00pH/10 °C –0.16pH/10 °C –0.32pH/10 °C
Diagnostics	Sensor and electronics
Case	Weatherproof, corrosion-resistant plastic housing
Approvals	CE Mark for Industrial Applications UL – General Purpose CSA – General Purpose FM Class I, Div. 1, Groups A, B, C, D and Class I, Zone 0, AEx ia IIC (I.S.) FM Class I, Div. 2, Groups A, B, C, D; Class I, Zone 2, Groups IIC (non-incendive field wiring) Enclosure: IP66, Type 4x
Remote Mounting	Pipe, Wall, or DIN Rail
Dimensions	H 123 mm (4.84”) x W 48 mm (1.89”) x D 46 mm (1.81”)
Weight	Approximately 142 g (5.0 oz.)

Dimensions

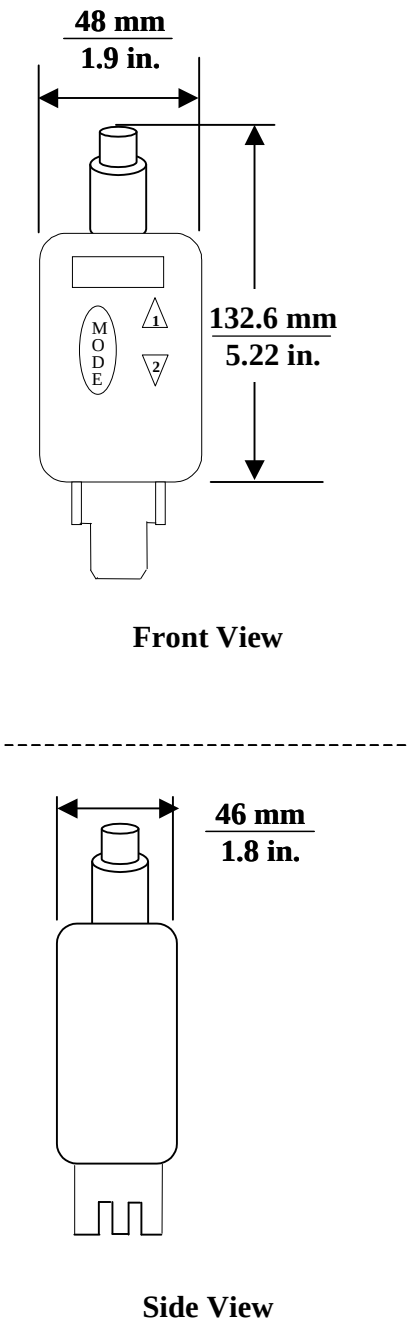


Figure 2 — Dimensions

Mounting

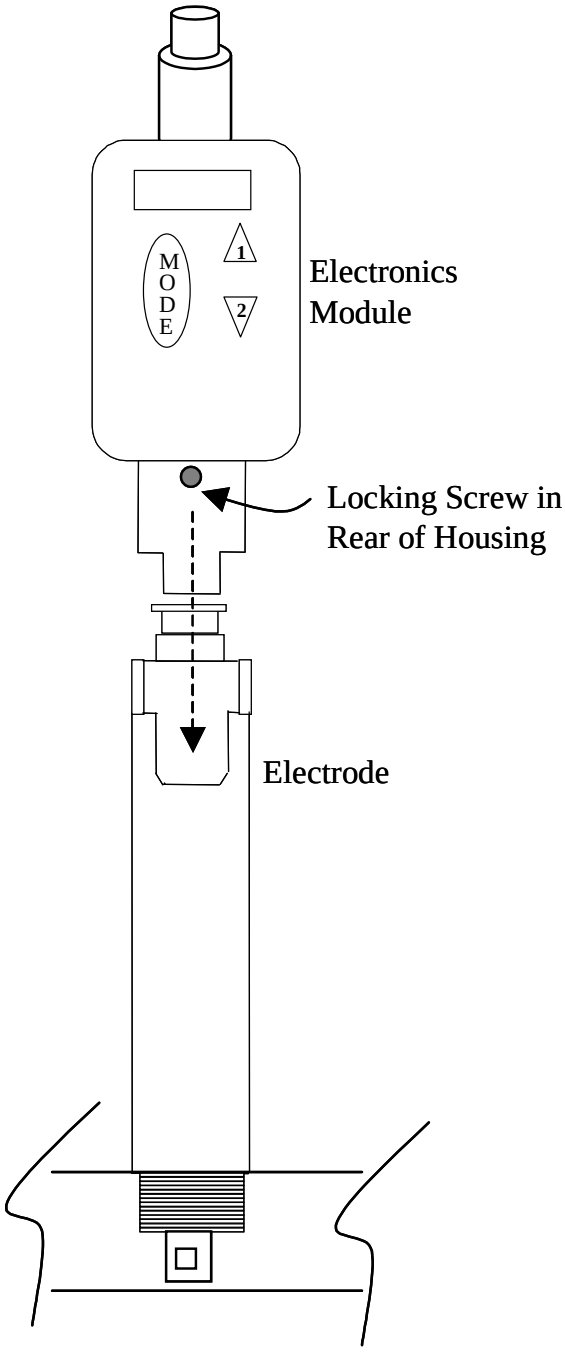


Figure 3 — Integral Mounting

Remote Mounting

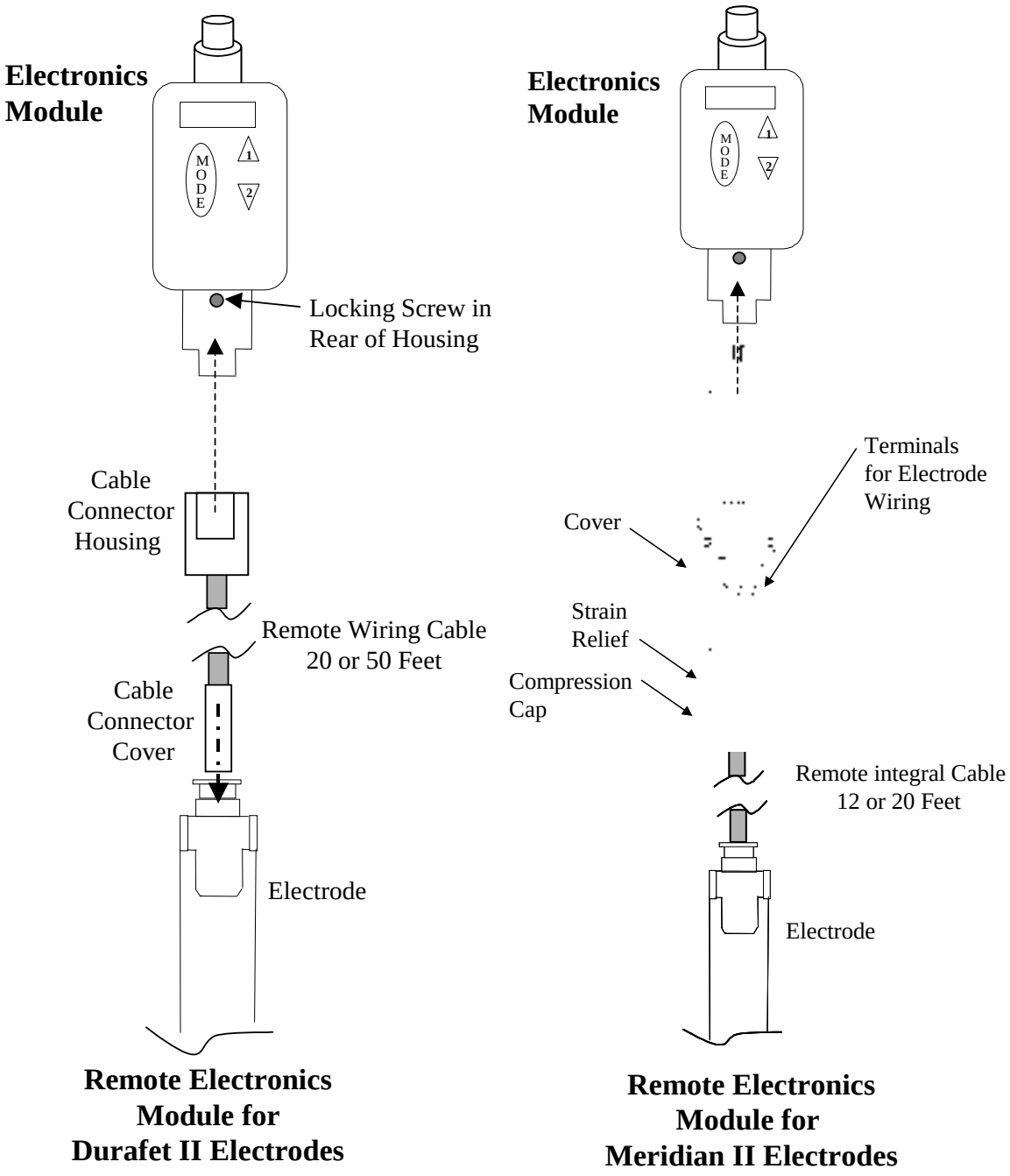
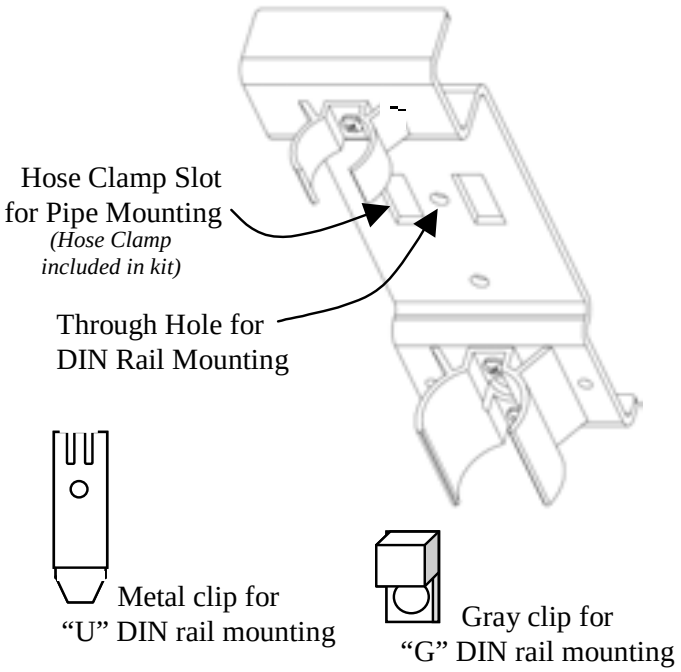


Figure 4 — Remote Mounting

Remote Mounting Hardware



Mounting Kit

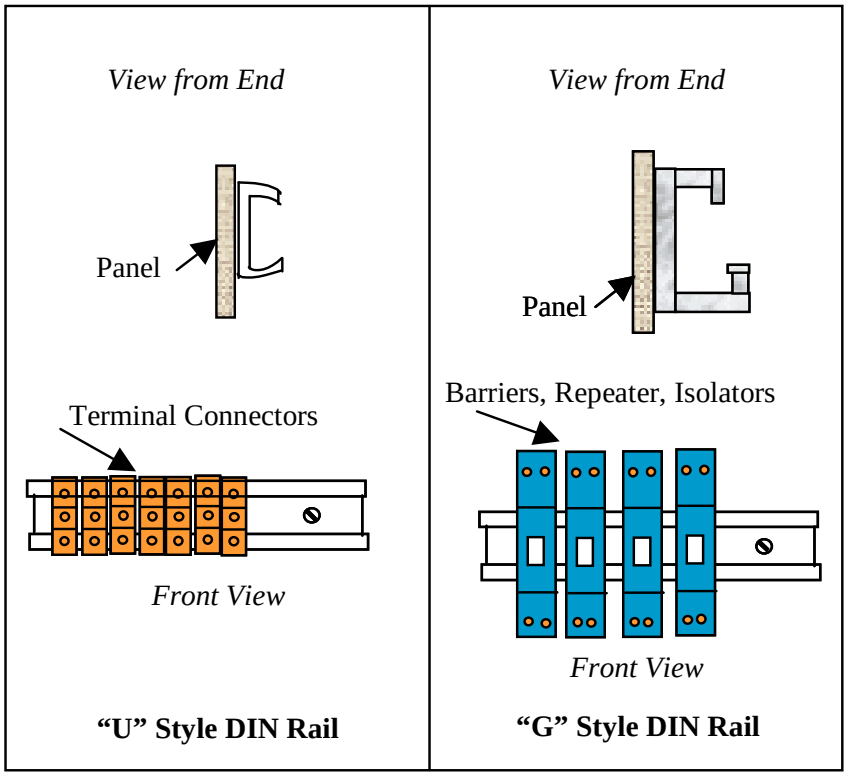


Figure 5 — Remote Mounting Hardware

Model Selection Guide

Instructions

- Select the desired key number. The arrow to the right marks the selection available.
- Make the desired selections from Tables I through IV using the column below the proper arrow. A dot (•) denotes availability.

Key Number ____ - I ____ - II ____ - III ____ - IV ____

Key Number - DirectLine® Sensor Electronics Module

(Specify electrodes/cells/probes separately)

		Selection	Availability				
pH	For use with Durafet II, Meredian II & HPW7000 pH electrodes	DL421	↓				
ORP	For use with ORP electrode.	DL422		↓			
Conductivity	For use with Contacting Conductivity Cells	DL423			↓		
DO - PPM	For use with Dissolved Oxygen ppm Probes	DL424				↓	
DO - PPB	For use with Dissolved Oxygen ppb Probes	DL425					↓

TABLE I - OUTPUT CABLE

Output Cable for Integral or Remote Mounting	None (replacement module or customer supplied output cable) - *Note 1*	D	•	•	-	-	-
	Cordset - 6m (19.7 ft.) - includes connector and cable - *Note 2*	E	•	•	•	•	•
	Field Wiring Connector *only* - customer supplies cable only - *Note 2*	F	-	•	•	•	•

TABLE II - SENSOR CABLE/REMOTE CONNECTOR (between electronic module and electrode, sensor or pro

Integral Mounting	No cable or connector required	0	d	d	d	d	d
Remote Mounting Cable - Durafet only	6,096m (20 ft.) of sensor cable - Durafet II Remote Mounting	1	e				
	15.24m (50 ft.) of sensor cable - Durafet II Remote Mounting	2	e				
Remote Mounting Connector (Cable is supplied with sensor or probe)	Remote Mounting Connector - Meredian II pH	3	e				
	Remote Mounting Connector - Meredian II ORP	3		e			
	Remote Mounting Connector - HPW7000	4	e				
	Remote Mounting Connector - Conductivity	5			e		
	Remote Mounting Connector - Dissolved Oxygen	6				e	e

TABLE III - REMOTE MOUNTING OPTIONS

Mounting Kit for Remote Mounting	None Integral unit - mounting not required	A	•	•	•	•	•
	2" (5,08 cm) Pipe mtg. bracket, wall mtg. & DIN Rail clip	B	-	•	-	-	-

TABLE IV - OPTIONS

Tagging	None	00__	•	•	•	•	•
	Linen Customer ID Tag - 3 lines w/22 characters/line	LT__	•	•	•	•	•
	SS Customer ID Tag - 3 lines w/22 character/line	SS__	-	-	-	-	-
Certificates	None	__00	-	-	-	-	-
	Calibration & Conformance	__CC	•	•	•	•	•

Notes:

1 Customer supplies cordset ***or*** cable with M12 connecter. Suppliers & P/Ns include:

	Phoenix Contact	Turck
Cord--set	SAC-3P-5.0-PUR/M12FSSH Stainless	RKV4T-6/S618
M12 Field Wiring Connector	SACC-M12FS-4CON-PG7	B8141-0
Cable	2-wire twisted shielded pair	

2 Recommended cable is 2-wire twisted shielded pair

RESTRICTIONS

Restriction Letters	Available Only With		Not Available With	
	Table	Selection	Table	Selection
d	III	A		
e	III	B		

ORDERING INSTRUCTIONS:

1. Part numbers are provided to facilitate Distributor Stock.
2. Orders may be placed either by model selection or by part number.
3. Part numbers are shown within the model selection tables to assist with compatibility information.
4. Orders placed by model selection are systematically protected against incompatibility.
5. Compatibility assessment is the responsibility of the purchaser for orders placed by part number.
6. Items labeled as N/A are not available via the stocking program and must be ordered by model selection.

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use. © Honeywell 2010.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

DirectLine, Durafet II and Meredian are registered trademarks of Honeywell.

For More Information

Learn more about how Honeywell's DirectLine Sensor for Durafet II and Meredian II pH/ORP Electrodes can offer savings during installation, start-up, operation, and maintenance, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

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70-82-03-40
January 2003
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Technical Information

Honeywell

DL2000 Low Cost DirectLine pH Electrodes Specifications

70-82-03-59 September 2007

Overview

The DL2000 pH electrodes are to be used with the DL421 DirectLine pH module. The durable Ryton body construction, single junction reference and glass spherical measuring sensor provides for rugged and dependable pH electrode for light industrial applications.

DL2000 pH electrodes are available with ¾" NPT threads at the top and bottom for easy in-line, pipe tee or submersion mounting. An integral 8550 Ohm temperature sensor is standard on all electrodes for accurate temperature measurement for Nerstian compensation with in the DL421 module.

pH Electrodes

Features

DL2000 Electrodes

- **Rugged Ryton body construction** is virtually unbreakable in most light industrial applications
- **In-line, pipe tee or submersion mounting** for a variety of installation options
- **¾" NPT mounting threads** provide for easy installation
- **Integral, reliable 8550 Ohm temperature compensator** ensures accurate temperature measurement
- **Integral 20' cable** for remote mounting to DL421 DirectLine Sensor Module

DL421 DirectLine Module

- **Direct 4-20 mA output** eliminates need for dedicated analyzers or transmitters, simplifying installation, start-up, operation, and maintenance tasks
- **Integral electronics with local HMI** simplifies installation and shortens calibration times
- **Local display and keypad** facilitates quick set-up, calibration, and operational activities
- **Sample or auto buffer calibration options** accommodates individual calibration techniques and reduces calibration time

Specifications

DL2000 pH Electrode	
pH Range	0 – 14 pH
Wetted Materials	Body: Ryton Sensor: Glass Reference Junction: Porous HDPE
Temperature Rating	0 – 65° C (32 – 149° F)
Pressure Rating	4.8 bar (70 psig)
Temperature Compensator	8550 Ohm thermistor
Cable	Integral 20’ length
Mounting	¾” NPT male thread
Dimensions	25.4 mm body (1”) 120.6 mm length (4.75”)

For More Information

Learn more about how Honeywell’s DL2000 Low Cost DirectLine pH Electrodes simplifies installation and shortens calibration times, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

1860 West Rose Garden Lane

Phoenix, Arizona 85027

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www.honeywell.com/ps

70-82-03-59

September 2007

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Technical Information

Honeywell

Durafet Non-Glass pH Electrodes Specifications

70-82-03-50 February 2004

Description

Honeywell defines state-of-the-art pH measurement with the Durafet® pH electrode, an industrial, non-glass, unbreakable, Ion Sensitive Field Effect Transistor (ISFET)-based pH sensor. This industry-proven pH electrode, with over 11 years of application experience, provides fast, accurate and dependable pH measurement in the most demanding applications. The Durafet electrodes include a connector, enabling easy and reliable electrode replacement without twisting of cables. Durafet III electrodes are designed with a rugged waterproof Vario Pin connector. Durafet II electrodes have a P.C board connector.

Durafet electrodes offer a reliable combination of measuring and reference electrodes together with an integral automatic temperature compensator in a 1-piece construction. The compact Durafet electrodes are available in two basic designs: a ¾" NPT male threaded connection or a 12mm diameter electrode (Durafet II only). The type of design is based on the mounting.

DurafetIII pH Electrode with Vario Pin

DurafetII pH Electrode with PC Board Connector

Features

Durafet Electrode:

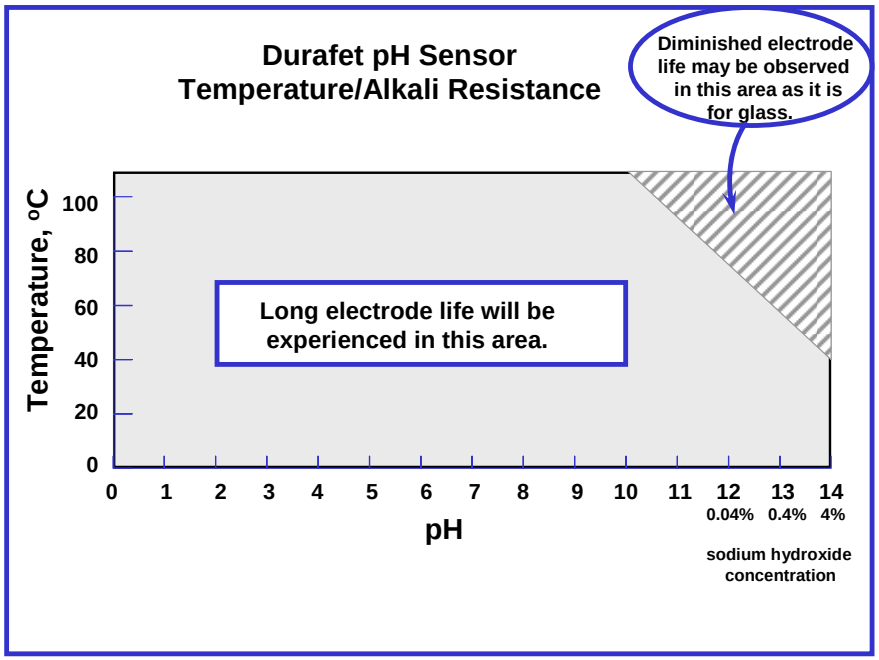
- **NEW!** Durafet III Vario Pin quick disconnect waterproof cable option
- Uses ISFET (Ion Sensitive Field Effect Transistor) technology for exceptionally fast response
- Non-glass - virtually unbreakable, truly solid state.
- Stable pH signal over time for less frequent calibrations
- Cable connector designs for easy electrode installation/ replacement
- Chemically resistant Ryton body
- KCl gelled reference for long life and reduced maintenance
- Reference junction frit and gel are replaceable, extending electrode lifetime
- Low impedance pH signal.
- ¾" NPT mounting design with connections at top and bottom of electrode for in-line or immersion installations
- Durafet II 12mm diameter body design for use with various Honeywell installation mountings
- One electrode for entire pH and temperature ranges
- Can be used with entire Honeywell line of instrumentation: APT Series, 9782 Analyzers, DirectLine® Sensor modules

Specifications

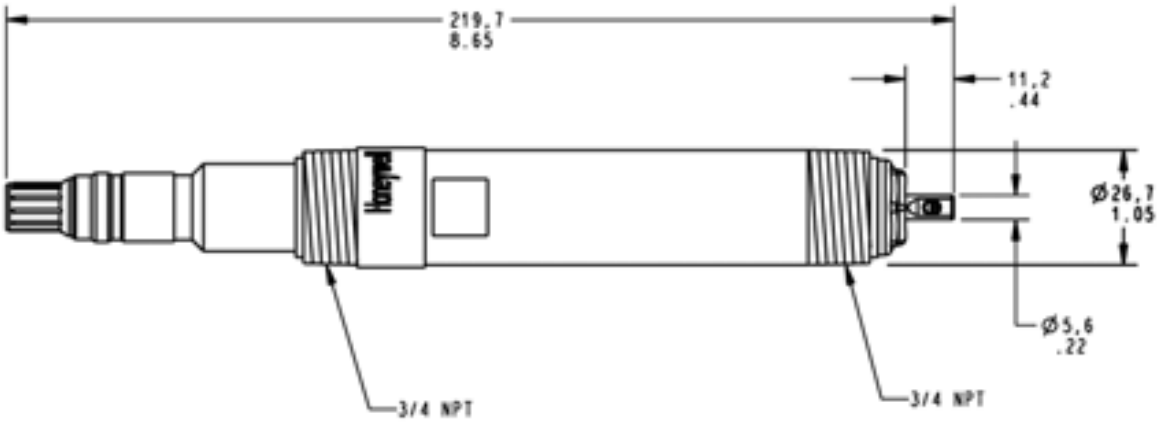
	Electrode Style	
	¾" NPT	12mm diameter
Operating Range	0-14 pH	
Pressure Rating	345 kPa (50 psig) @ 100°C, 690 kPa (100 psig) @ 50°C	
Temperature Rating	-10 to 110° C	-10 to 110° C (130° C for intermittent sterilizations)
Temperature Sensor	8550 ohm Thermistor and 1000 ohm RTD	
Wetted Materials	Ryton body, silicon ISFET die, Ceramic reference junction, Viton media seal, EPM reference frit seals	
Electrical Connection	Durafet III: Vario Pin, 11 conductor connector, IP68 rated Durafet II: PC Board Connector	
Acceptable Cables and Lengths (ordered separately)	DirectLine Remote Cable: 20 feet and 50 feet Cap Adapter (for 9782P and APT Series): 20 feet and 50 feet	
Weight	Durafet III: 0. 23 kg (0.5 lb) Durafet II: 0.11 kg (0.25 lb)	Durafet II: 23 g (0.8 oz)

Operating Conditions

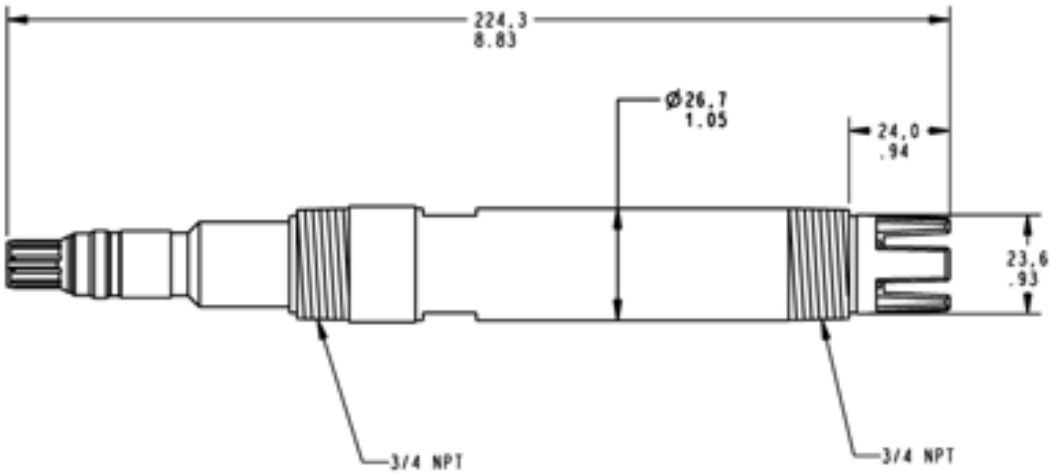
The lifetime of Durafet pH electrodes is adversely affected by hydrofluoric acid (HF) and conditions of high pH and high temperature. The graph below is a guideline for the Durafet electrode when exposed to the high pH and high temperature conditions.



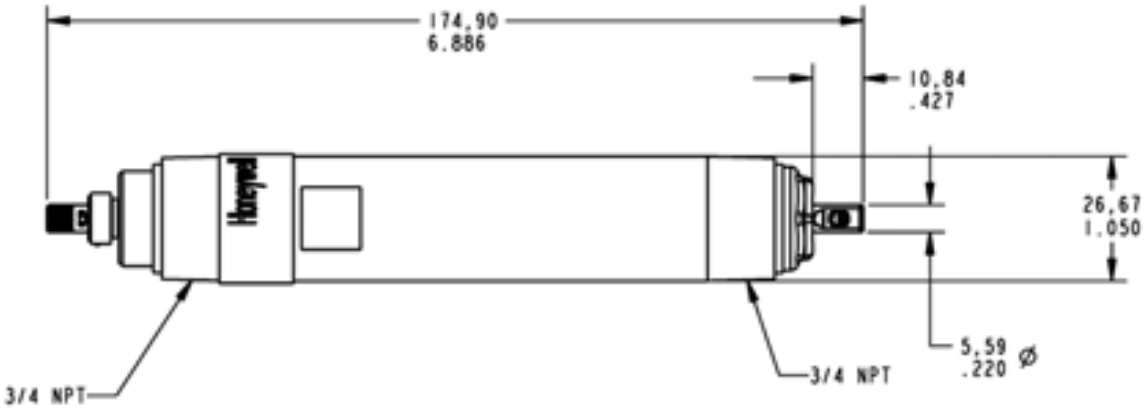
Dimensions



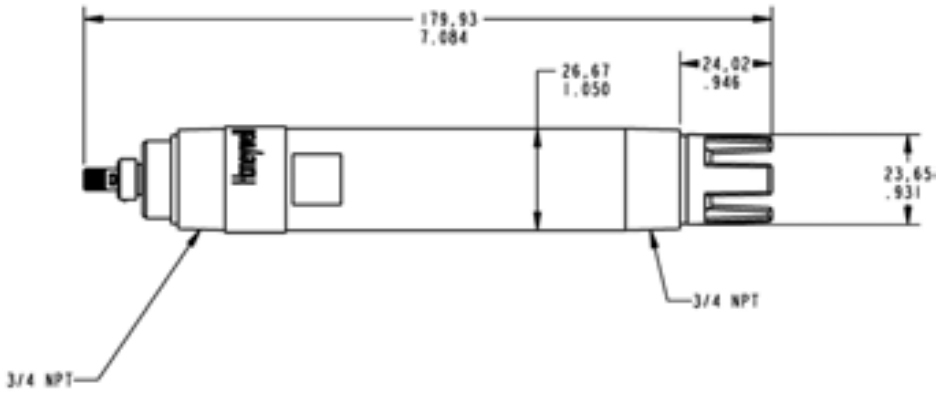
Durafet III (Vario Pin Connector) pH Electrode for In-Line Mountings (Smooth Tip)



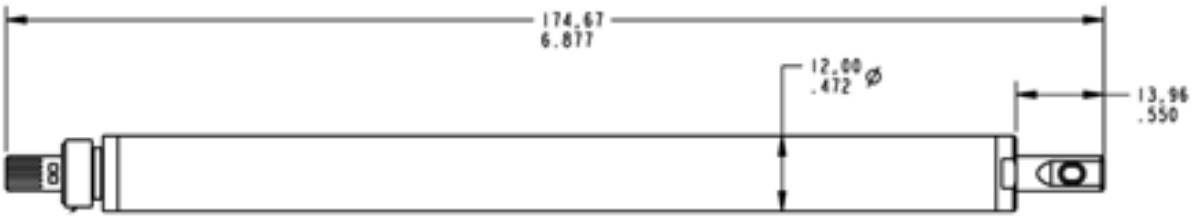
Durafet III (Vario Pin Connector) pH Electrode for Immersion Mountings (Guarded Tip)



Durafet II (PC Board Connector) pH Electrode for In-Line Mountings (Smooth Tip)



Durafet II (PC Board Connector) pH Electrode for Immersion Mountings (Guarded Tip)



Durafet II (PC Board Connector) pH Electrode 12mm diameter

Cable Compatibility

The Durafet pH electrodes are designed with a connector for easy installation and replacement. Two connectors are available:

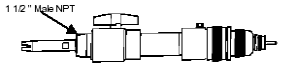
- Durafet II with PC Board Connector
- Durafet III with Vario Pin Connector

Use a DirectLine Remote Cable to connect to a DirectLine module. Use Cap Adapter cable to connect to a 9782 Series Analyzer or to an APT Series Transmitter or Analyzer. The table below identifies the different cable part numbers.

Cable	Durafet II	Durafet III	
Cap Adapter 8’ 12’ 20’ 50’	 51205965-007 51205965-001 51205965-002 51205965-005	 - - 51453388-001 51453388-002	
DirectLine 20’ 50’	 51500270-001 51500270-002	 51453225-001 51453225-002	

Electrode Mounting Compatibility

The various styles of Durafet electrodes are compatible with specific mounting designs, marked by X in the table below.

Electrode Mounting ↓ / Electrode Style →	¾" NPT Durafet III	¾" NPT Durafet II	12 mm diameter Durafet II	¾" NPT Integral DirectLine Durafet II
7777DVP	X			
DirectLine – Integral				X
DirectLine – Remote	X	X		
7777D		X		
7774D (SS)			X	
7774D (CPVC) 		X		
7773D			X	
7758D			X	

Durafet and DirectLine are registered trademarks of Honeywell.

For More Information

Learn more about how Honeywell's Durafet Non-Glass pH Electrodes can be used for a variety of industrial or sanitary applications, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

1860 West Rose Garden Lane

Phoenix, Arizona 85027

Tel: 1-800-423-9883 or 1-800-343-0228

www.honeywell.com/ps

70-82-03-50
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Technical Information

Honeywell

HPW7000 HiPurity Water pH and ORP Measurement System Specifications

70-82-03-28 July 2009

Overview

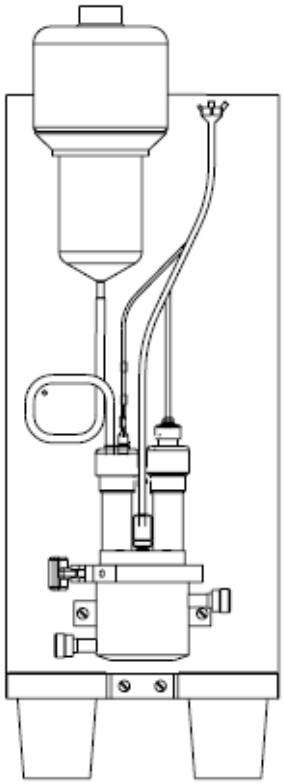
The HPW7000 HiPurity pH Water Measurement System is an electrode mounting assembly designed specifically for the difficult pH and ORP measurement in high purity water applications. The special flow chamber and electrode mounting simplifies installation and calibration while providing a pH or ORP measurement that is unsurpassed in accuracy and stability.

Description

The HPW7000 combines a specially designed stainless steel stainless steel flow chamber with a measuring/reference electrode system and integral temperature sensor/solution ground. This mounting assembly provides accurate and stable pH and ORP measurement in low conductivity (<10µmho/cm) water.

The specially designed flow chamber optimizes the sample flow volume and creates the proper flow and mixing patterns to make the most accurate and stable pH and ORP measurement. In addition, the assembly installation is foolproof. The flow chamber cover is keyed and the electrode position is fixed so that the user will continue to get the same superior measurement results every time a calibration or replacement is done. A quick opening clamp holds the electrodes in place in the flow chamber. Removing and re- installing the electrodes for calibration is quick and easy with this clamp mechanism.

A flowing reference electrode is used to provide high accuracy and minimize calibration offset errors. A new flowing reference electrode design uses less electrolyte and does not require a large head pressure. This makes the mounting more compact in water sample panels where space is at a premium.



High Purity Electrode Mounting Assembly (Panel Mounted Option)

Electrode cables of up to 36 feet eliminate the need for mounting preamplifiers on the assembly.All electrode terminations are internal to the analyzer and are protected by the analyzer case. The electrode cables are all shielded to reduce the susceptibility to noise and make the measurement more stable.

Features

- Designed for high purity water applications, <10 µmho/cm conductivity
- Easy to install and ensures correct operation and maximum performance
- Reduces calibration and maintenance time and cost with a quick disconnect clamp top cover that allows the electrode assembly to be easily removed without tools or special instructions
- Lower maintenance cost and higher availability with a new reference electrode that is easy to fill and does not require any special tools or instructions
- Unsurpassed stability
- Minimal long term drift
- Minimizes calibration errors
- Small assembly that can be panel or surfaced mounted
- Improved temperature sensitivity
- Sample flows 50-500 cc/min

Specifications

pH Range (operating) ORP Range	0 – 14 pH (4 to 10 pH) -1600 to +1600 mV
Temperature Sensor	-20 to 150°C
Conductivity Range	< 10 µmhos/cm
Accuracy (pH)	±0.1 pH
Noise (pH)	<0.1 pH
Stability/Drift (pH)	±0.1 pH/wk
Process Connection	1/4" male - side mounted on flow assembly
Pressure	Downstream back pressure –10” W.C. (min), +1.0” W.C. (max)
Temperature	Assembly: 10° - 45°C Electrodes: 10° - 80°C
Flow Assembly	316 LSS
Electrode Covers	316 LSS
Finish	150 grit polish minimum

For More Information

Learn more about how Honeywell’s Hi-pHurity Water pH and ORP Measurement System can unsurpassed in accuracy and stability, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions
1860 West Rose Garden Lane
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www.honeywell.com/ps

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Honeywell

Twist Lock Mounting for Durafet II pH Electrode Series TL1000 Specifications

70-82-03-43 May 2003

Overview

The TL1000 Series, Twist Lock Mounting, provides an easy way to install/remove Durafet® II pH electrodes from pipelines and tees. A quick 1/4 turn is all that is required for installation/removal. This quick 1/4 turn does not twist cables as you attempt to install or remove an electrode from the process during calibration, maintenance, and replacement. The threaded mounting bushing is available in two sizes (3/4" or 1" male NPT) and three materials of construction (316 SS, Kynar, and CPVC), for use in a wide variety of applications and instrumentation, including the APT Series DirectLine® Sensor Modules and 9782 Series Analyzers.

Description

The TL1000 Series of pH electrode mountings is specifically designed to adapt the Durafet II pH electrode into a Twist Lock process mounting. The Twist Lock Mounting provides a quick and easy way to interface the Durafet II pH electrode for process pH measurement. A 1/4 turn is all that is needed to lock the electrode into a mounting bushing for safe and fast installation.

Easy Installation/Removal

The Durafet II electrode already has a time saving connector that eliminates having to pull cable when replacing an electrode. The TL1000 provides additional time savings by eliminating the need for wrenches and time to thread and unthread the electrode.

The TL1000 consists of a mounting bushing that is threaded into the process and a Durafet II pH Twist Lock adapter that locks into the mounting bushing. The mounting bushing has slots that align with pins on the Durafet II pH adapter. A simple 1/4 turn of the Durafet II pH adapter positions the pins into the locked location in the mounting bushing. The locking pins are visible through an opening 90° from the mounting slots so that you are ensured of correct installation.

"No Hassle" Calibration and Maintenance

During calibration of a Durafet II electrode you want to keep the cable connected when removing the electrode so power is maintained to the Durafet sensor. If power is interrupted then you have to wait up to 15 minutes for the Durafet sensor to "warm up" to get a stable pH reading.

The TL1000 mounting eliminates cables from twisting when trying to install or remove an electrode for calibration or maintenance. For most threaded mountings you have to thread or unthread the electrode when installing or removing it. While turning the electrode in these conventional threaded mountings the electrode's cable becomes a twisted mess and breakage of conductors inside the cable is possible. The Twist Lock mounting only requires a quick 1/4 turn and this does not twist up the cable.

Safe Operation

The TL1000 design uses a simple locking procedure to ensure that the electrode is securely positioned into the mounting bushing and will be able to withstand pressures of up to 150 psi. The locking pins on the electrode adapter can be seen through an opening on the mounting bushing so that you are sure that the electrode is positioned correctly to withstand the process pressure. Dual external O-rings on the Durafet II pH adapter and an internal O-ring are made of EPDM. This O-ring design seals the electrode and the adapter from process leakage.

Durafet II pH Electrode Performance

The TL1000 mounting is for interfacing the Durafet II pH electrode to a process where a threaded mounting is used. The Durafet II pH electrode is the only industrial, non-glass pH electrode available. The solid state, ISFET (Ion Sensitive Field Effect Transistor) sensor is very durable and can withstand the harsh industrial environments that pH electrodes are usually subjected to in process applications. The Durafet II pH electrode is a fast responding, stable electrode that provides accurate pH measurement with reduced calibration and maintenance costs.

Features and Benefits

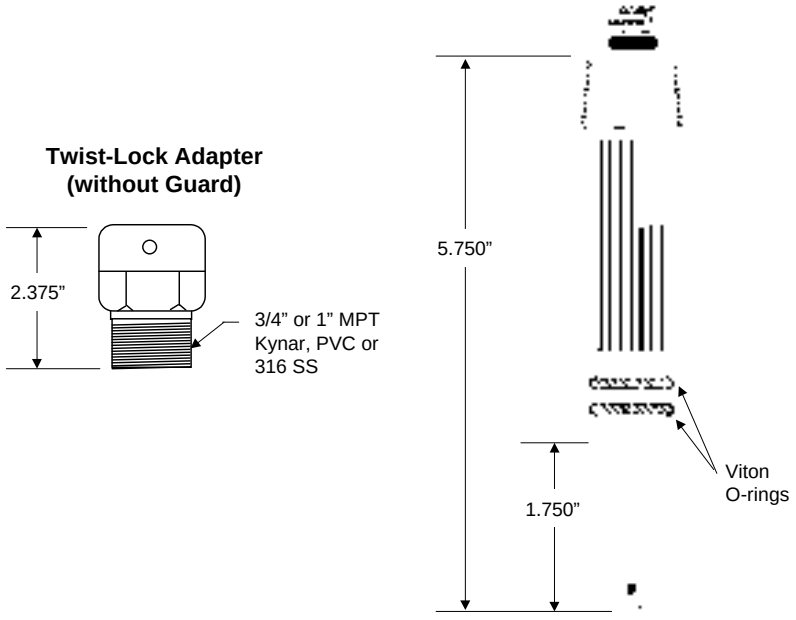
- Quick 1/4 Turn Installation Removal – Fast and Easy Calibration and Maintenance
- No Electrode Threading – No Twisted Cable Problems
- Easy Locking Design – Safe Process Mounting Under Pressure
- 3/4” or 1” Process Threads – Wide Variety of Mounting Options
- 316 SS, Kynar, or CPVC Mounting Bushing – Suitable for Wide Range of Applications
- Dual External EPDM Seals – Prevents Process Leakage
- Durafet II pH Electrode – Reliable and Accurate pH Measurement

Specifications

pH Operating Range	0-14 pH
Pressure Rating	150 psi @ 80 °C
Temperature Range (Durafet II Electrode)	–10 °C to 110 °C (14 °F to 230 °F)
Process Connection	3/4” and 1” MNPT
Mounting Bushing Materials of Construction	316 Stainless Steel, Kynar, and CPVC
Electrode Adapter Materials of Construction **Durafet Electrode** **Adapter**	 Ryton body, Viton or EPDM seal, silicon ISFET, ceramic reference junction Ryton body, 316 SS locking pins, Viton or EPDM O-rings
Conduit Connection	3/4” MNPT
Weight **Mounting Bushing** **Electrode Adapter**	 *316:* 0.80 lb. (363 g) *Kynar:* 0.16 lb. (73 g) *CPVC:* 0.14 lb. (64 g) 0.25 lb (113.5 g)

Dimensions

Durafet® II Twist-Lock Electrode



Model Selection Guide

Instructions

- Select the desired key number. The arrow to the right marks the selection available.
- Make one selection per table, using the column below the proper arrow. A dot denotes unrestricted availability. A letter denotes restricted availability.

Key Number	I	II	III	IV
_ _ _	- _ _	- _	- _ _	- _

KEY NUMBER

Description	Selection	Availability ↓
Twist Lock Electrode Mounting for Durafet II Electrodes	TL1	

TABLE I - Mounting Thread Size, Material, Tip Guard - (Note 1)

Thread Size	Material of Construction	Tip Guard		
3/4 " NPT	316 Stainless Steel	No	01	•
	Kynar	No	02	•
	CPVC	No	03	•
1" NPT	316 Stainless Steel	No	04	•
	316 Stainless Steel	Yes	05	•
	Kynar	No	06	•
	Kynar	Yes	07	•
	CPVC	No	08	•
	CPVC	Yes	09	•

TABLE II - Reference Electrode Type, Temperature Sensor, Electrode Part Number

Reference Electrode/ Seal Material	Temperature Sensor	Part Number (Note 2)		
Single Junction/Viton	8550 Ohm Thermistor	51451346-001	A	•
	100 Ohm RTD	51451346-002	B	•
	1000 Ohm RTD	51451346-003	C	•
Single Junction/EPDM	8550 Ohm Thermistor	51451346-007	G	c

TABLE III - Cable Type, Length

Cable Type	Cable Length	Selection	Availability
None		00	•
With Cap Adapter (Direct Input to 9782/APT)	4 feet (1,22 meters)	01	•
	8 feet (2,44 meters)	02	•
	12 feet (3,66 meters)	03	•
	20 feet (6,10 meters)	04	•
	50 feet (15,24 meters)	05	•
Without Cap Adapter (Preamp Required)	4 feet (1,22 meters)	11	•
	8 feet (2,44 meters)	12	•
	12 feet (3,66 meters)	13	•
	20 feet (6,10 meters)	14	•
	50 feet (15,24 meters)	15	•

TABLE IV - OPTIONS

Tagging	Linen Customer I.D. Tag - (limit to 3 lines, 22 spaces per line)	L	•
	Stainless Steel Customer I.D. Tag - (limit to 3 lines, 22 spaces per line)	S	•

Notes:

1. For Pipe Mounting Adapter only, determine P/N from Accessories Table below and obtain price from order entry system.
2. For Replacement Electrode specify associated part number and price from Table II.

RESTRICTIONS

Restriction Letter	Table	Available Only With Selection
c	**I**	**01**
	III	**00 or 04**

Accessories and Replacement Parts

Description	Part Number
pH Buffer Solutions - one pint	
4.01	31103001
6.86	31103002
9.18	31103003
Pipe Mounting Adapter	
3/4" NPT Thread	
316 SS without guard	51451355-001
Kynar without guard	51451355-002
CPVC without guard	51451355-003
1" NPT Thread	
316 SS without guard	51451355-004
316 SS with guard	51451355-005
Kynar without guard	51451355-006
Kynar with guard	51451355-007
CPVC without guard	51451355-008
CPVC with guard	51451355-009

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and **is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose**. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Durafet II and DirectLine are registered products of Honeywell.

For More Information

Learn more about how Honeywell's Twist Lock Mounting for Durafet II pH Electrode provides an easy way locking design, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

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Technical Information

Honeywell

UDA2182 Universal Dual Analyzer Specifications

70-82-03-54 January 2009

Overview

The UDA2182 Universal Dual Analyzer is a new, economical, dual input analyzer addition to Honeywell's Smart Sensor product family.

The analyzer can accept single or dual inputs from Honeywell pH, ORP, contacting conductivity and dissolved oxygen sensors. For dual units the inputs can be ordered in any combination.

The UDA2182 monitors and controls Analytical process variables in applications such as:

- Power water quality control
- Wastewater influent & effluent
- Pure water preparation
- Food and Dairy
- Neutralization

Features

- Single or Dual input measurement
- Dual input in any combination of pH, ORP, contacting conductivity, or dissolved oxygen
- Versatile, backlit graphical display
- Infrared PC & Pocket PC configuration
- Optional input from Honeywell remote digital preamplifiers and Durafet Cap Adapters
- Isolated inputs and outputs
- CSA Type 4X (NEMA 4) enclosure
- Multilanguage prompts
- Two analog outputs standard plus one additional optional
- Two electromechanical relays standard plus two additional optional
- Real Time clock for Auto and History functions

Figure 1 - Front of UDA2182 Analyzer

- Auto Clean/Auto Cal functions
- Event History screens
- Calibration History information
- Easy access through hinged front door
- Full DIN Size
- Panel, wall or pipe mounting is available
- Easily Field Up-gradable
- Ethernet and RS485 Communications

The UDA2182 is a functional replacement for older Models 7082 and 9782 Analyzers. It will fit into the same panel cutout and has many of the same features and benefits of the former analyzers. Therefore it is compatible with existing pH and conductivity applications and installations.

The UDA2182 is UL Listed and CSA Certified. It is also CE Compliant.

The unique UDA2182 display is a graphical backlit LED. Two PV values along with their Unit of Measure can be displayed simultaneously. The process temperature of both PVs is also displayed. The versatile display will also display the analog output FS percent and the state of the relays.

Features (continued)

Tagging and time or date information as well as status messages are available on the display and are easily configured by the user.

Configuration can be done with a PC through communication or with a Pocket PC, using the embedded infrared communication port. No need to get access to the back of the controller to download or upload a brand new configuration!

Analytical Inputs

The UDA2182 is a “Mix & Match” design. Analytical measurements of pH, conductivity and dissolved oxygen (ppm or ppb) can all be done in one analyzer. The unit can be used as a single input or dual input instrument – the user decides what measurements are included.

The input boards are easily replaced and the addition of additional relays or an analog output is done with a single board. The “Mix –n– Match” design reduces inventory and increases flexibility. A user can purchase a basic unit and then add input and output boards as needed. The board changes are fast and easy with front, hinged access to the analyzer.

The wiring is easily accessible through the front and the boards can be pulled out to facilitate the wiring of sensor inputs. Inputs are isolated so grounding problems associated with sensor input signals are minimized.

Outputs and Control

The following output types are available:

- Current Outputs (4-20 or 0-20 ma)
- Electromechanical Relays (5 amps)

The outputs are isolated and can be field allocated to the input PV, temperature, or computed value (conductivity).

Control Algorithms – Depending on the output algorithms specified, the controller can be configured for the following control algorithms:

- On-Off
- Current Adjusting Type (CAT)
- Pulse Frequency Type (PFT)
- Duration Adjusting Type (DAT)
- PID

Each control loop has as standard an auto-tuning feature using Honeywell’s performance proven Accutune III tuning algorithm. A selectable “Fuzzy Logic” algorithm is also provided for each loop to suppress unwanted process setpoint overshoot.

Alarms

Two (or four) electromechanical alarm relays are field selectable for activating external equipment when preset alarm setpoints are reached based on the PV. Each alarm setpoint can be either a high or low alarm. The relays can also be assigned to temperature or diagnostics. The alarm hysteresis is configurable from 0 to 100% of range.

Operator Interface

Display – The UDA2182 has a versatile backlit, graphical LED display that is easy to read, even in the most difficult installations.

Multi-language prompts guide the operator step-by-step through the configuration process assuring quick and accurate entry of all configurable parameters. Nine languages are available via configuration: English, French, German, Spanish, Italian, Russian, Turkish, Polish and Czech.

Real Time Clock —A versatile clock set-up can be displayed on the tag name stripe and is used to initiate Auto Clean/Auto Cal functions and date/time stamp history logs.

Dedicated Keys —Provide direct access to Setup and Calibration to simplify and speed operation. Display key gives you access to advance function screens such as Control, Auto Cycling, USP26 and Calculated pH.

Miscellaneous

Moisture Protection – CSA Type 4X (NEMA 4X) rating for front and case permits use in applications where it may be subjected to moisture, dust, or hose-down conditions.

CE Mark – Conformity with 73/23/EEC, Low Voltage Directive and 89/336/EEC, the EMC Directive as a standard feature.

Approval Body Options – General Purpose CSA certification and UL listing and FM/CSA Class I, Div. 2 is standard.

Data Security – Keyboard security protects configuration and calibration data, accessed by a configurable 4-digit code. Nonvolatile EEPROM memory assures data integrity during loss of power.

Calculated pH – High purity water pH can be calculated from Specific and Cation conductivities to be used as a check on in-line high purity water pH measurements.

Diagnostic/Failsafe Outputs – Continuous diagnostic routines detect failure modes, trigger a failsafe output value and identify the failure to minimize troubleshooting time.

High Noise Immunity –The controller is designed to provide reliable, error-free performance in industrial environments that often affect highly noise-sensitive digital equipment.

Quality/Support – The UDA2182 is covered by an 18-month warranty and backed up by a toll-free phone number for technical assistance (US Only).

Auto Buffer Calibration – for pH measurement the unit can be set up to recognize NIST, US, and Euro buffers and automatically select the standardize and slope values at the calibration temperature.

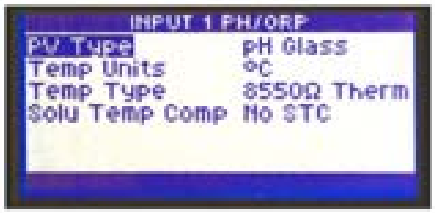
Solution Temperature Compensation – For high purity water measurement the user can select pre-set compensations or configure custom values.

USP26 Alarm Capabilities – Relays can be configured to alarm on conductivity values as determined by the USP26 Standards.

Computed Variables – For two-cell conductivity measurements, computed values of %Rejection/Passage, Difference, or Ratio can be displayed and assigned to the outputs or alarms. CO2 concentration in ppm can be calculated from de-gassed conductivity measurement.

Dissolved Oxygen –Auto-ranging of display and outputs with relays to indicate range, specialized probe bias diagnostics.

Auto Clean/Auto Cal –Built-in real time clock is used to set-up versatile cycles that can be used to initiate automatic sensor cleaning and then calibration.



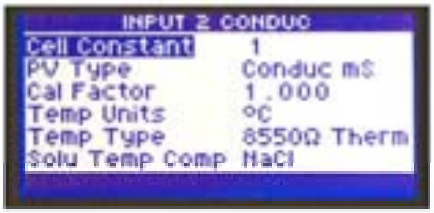
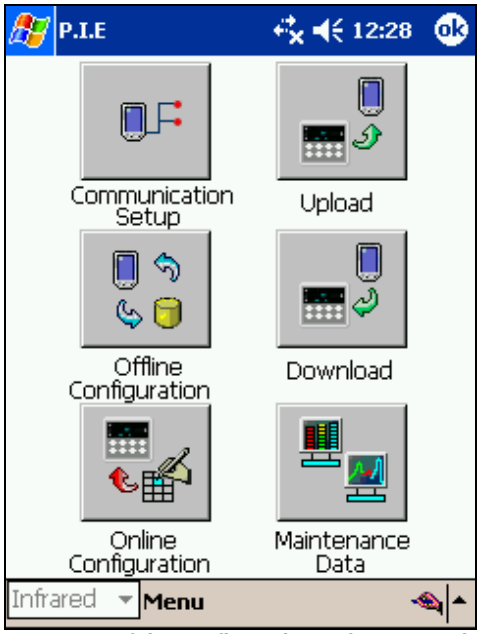


Figure 2 – UDA2182 Displays

PC & Pocket PC Software

Features

- Create configurations with intuitive software program running on a Pocket PC, a Desktop or a laptop computer.
- Create/edit configurations live; just connect software to analyzer via IR, RS485, or Ethernet
- Create/edit configurations offline and download to analyzer later via comm. port.
- Infrared port available on every UDA2182
- This software is available in English, Spanish, Italian, German, French, Russian, Turkish, Polish and Czech.



Screen capture of the configuration software running on a Pocket PC

Communications

Infrared

The infrared connection provides a non-intrusive wireless connection with the instrument and maintains NEMA4X integrity.

No need to get access to the back of the analyzer to communicate with the instrument, no need to take your screw driver to wire the communication cable, no wiring mistake possible! You can now duplicate an instrument's configuration, upload or download a new configuration in a matter of seconds, just by pointing your Pocket PC in the direction of the instrument.

Aim & Upload! It takes less than 2 seconds to upload a configuration from an instrument! You can then save the configuration file onto your PC or pocket PC for review, modification or archiving.

Furthermore, this software also gives you important maintenance information on the analyzer: instantly, get information on the current operating parameters, digital inputs and alarm status, identify internal or analog input problems.

Question: What if I have several analyzers on the same panel? How can I be sure I am communicating with the correct one?

Answer: The Infrared port is normally "off". You activate the infrared port on a particular analyzer by pressing any key. You can now communicate with the analyzer. If no communications are received for 2 minutes, the IR port will be shut down again.

Communications, Continued

Communications Card (Optional) The Communications card provides one Serial Port (RS485) and one Ethernet Port.

Serial port provides

- RS422/RS485 multi-drop
- 2400 to 115,200 programmable baud rate
- Modbus RTU protocol to read signals including PV, Temperature, Alarm Status, outputs, relay status, etc.
- Read/write four analog and four digital variables ***(Note 1)***

Ethernet port provides:

- Up to 5 Modbus simultaneous TCP connections
- Ethernet parameters are configured via the front-panel or web pages.
- Web server with up to 10 clients simultaneously
- Web pages ***(Note 2)*** setup the Ethernet port settings and monitor readings, alarms, statuses, events
- Multi-language Email to send alarm status changes. Alarm notification to eight email addresses. These must be configured using web pages signed in as the administrator.
- *DHCP*: (*Dynamic Host Configuration Protocol*) selectable via web page or front-panel
- Firmware upgrade to Main CPU board
- Firmware upgrade to Communications card

Note 1

There are four analog and four digital variables. These variables can be read and written remotely using Modbus function codes.

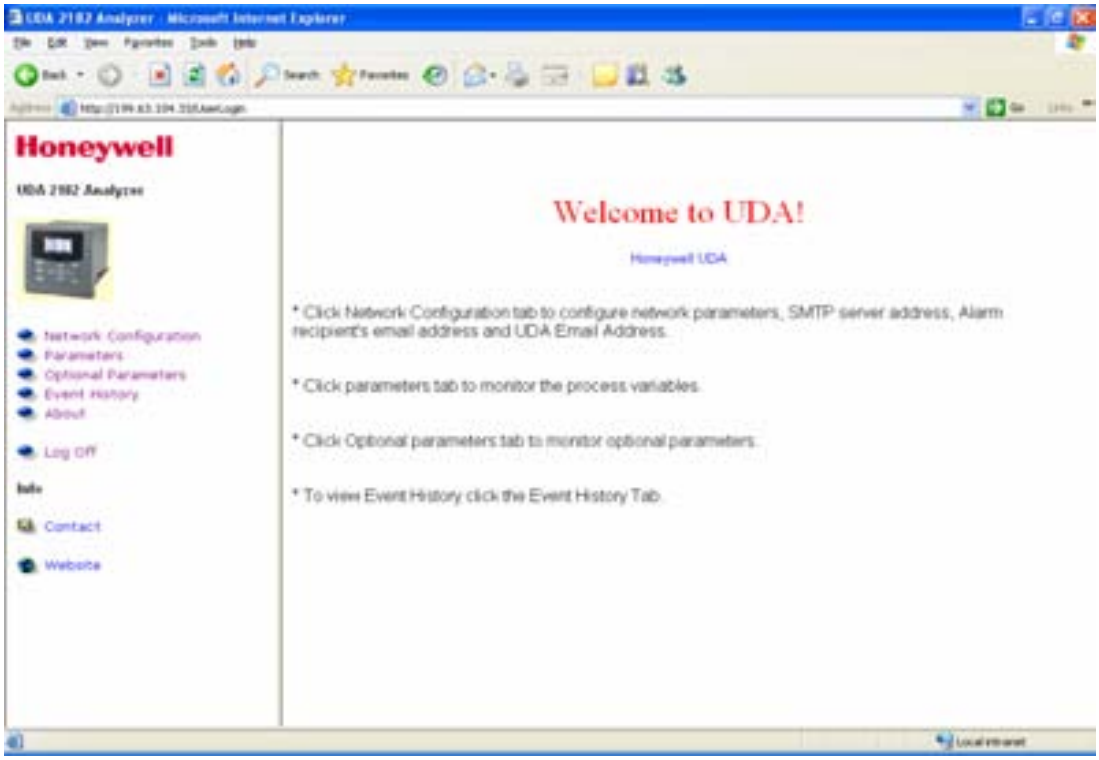
Variables will appear as a selection for various parameters:

- *Analog variables* can be an alarm source, analog relay source, current output source, monitor source, math source, auxiliary switch source, PID TRV, and PID remote setpoint.
- *Digital variables* can be an alarm disable, remote setpoint select, Tune Set2 select, digital relay source, logic-in source, auxiliary switch select, PID TRC select, PID RSP select, and auto cycle start source.

Note 2

Web pages provide the following:

- Multiple language support
- “Guest” accessibility for read-only permission
- “Admin” accessibility for read and write permission
- Readings of Inputs, Outputs, and Relay Outputs
- Status of Inputs, Outputs, and Alarms.
- Readings and Status of optional parameters (control, pharma, and auto-cycle)
- List of last twelve events
- Network configuration including IP address, subnet mask, gateway etc.
- Email configuration for alarm event notification


Honeywell
Welcome to UDA!
Network Configuration
Parameters
Optional Parameters
Event History
About
Log Off
Contact
Website
* Click Network Configuration tab to configure network parameters, SMTP server address, Alarm recipient's email address and UDA Email Address.
* Click parameters tab to monitor the process variables.
* Click Optional parameters tab to monitor optional parameters.
* To view Event History click the Event History Tab.

Screen capture of the UDA2182 Analyzer Web page

Specifications

UDA2182 Dual Input Analyzer	
Display	Graphical LCD with white LED Backlight Viewing Area: 66.8 mm (W) X 35.5 mm (H) Dot Pixels: 128 (W) X 64 (H)
Display Ranges	*pH:* 0-14 pH Temperature: -10 to 110°C (14 to 230°F) *ORP:* -1600 to +1600 mV *Conductivity:* 0.01 Cell: 0-2 uS/cm displayable to 200 uS/cm; 0-0.2 mS/cm; 0-2,000 ppb TDS; 0-200 ppm TDS 0.1 Cell: 0-20 uS/cm displayable to 2000 uS/cm; 0-2 mS/cm, 0-2,000 ppb TDS; 0-2,000 ppm TDS, 1.0 Cell: 0-200 uS/cm displayable to 20,000 uS/cm; 0-20 mS/cm; 0-200 ppm TDS; 0-20 ppt TDS 10 Cell: 0-2,000 uS/cm displayable to 99999 uS/cm; 0-200 mS/cm; 0-2,000 ppm TDS; 0-200 ppt TDS 25 Cell: 0-20,000 uS/cm displayable to 99999 uS/cm; 0-500 mS/cm; 0-10% Concentration displayable to 20% 50 Cell: 0-20,000 uS/cm displayable to 99999 uS/cm; 0-1,000 mS/cm; 0-20% Concentration Temperature: 0 to + 140°C (32 to 284°F) *Dissolved Oxygen:* 0 - 200 ppm 0 - 20 ppb 0 –200 ppb 0 – 2000ppb Temperature: 2 – 60°C (35.6 – 104°F), must not freeze

UDA2182 Dual Input Analyzer	
Keypad	10 Button Membrane Switch w/Directional Functionality UV/Solvent/Abrasion Resistant
Case Material	GE Valox® 357 (un-reinforced thermoplastic polyester)
Performances (Under reference operating conditions)	Accuracy: 0.5% of reading Output Accuracy: +/- 0.01 mA Drift: Negligible Repeatability: 0.05% Temperature Accuracy: pH and Conductivity Thermistor: +/- 0.1°C from –10 to 100° C, +/- 1.0° C from 101° to 140° C pH 1000 ohm RTD: +/- 0.4° C D.O. Thermistor: +/- 0.1° C from +2 to 60° C Reference Operating Conditions: 25 +/- 1° C; 10-40% RH; 120 or 240 Vac
Operating Conditions	Ambient Temperature Operating: 0 to 60°C (32 to 140°F) Storage: -30 to 70°C (-22 to 158°F) RH: 5 to 90% max. Non-condensing up to 40°C (104°F). For higher temperatures the RH specification is derated to maintain constant moisture content. Vibration: 5-15 Hz disp 8 mm pk to pk 15-200 Hz accel 2 G
Standard Analog Output	Two 0-20 or 4-20 mAdc, 750 ohms max., isolated from inputs, ground, and each other, independently field-assignable to any parameters and ranges. Proportional to user-set output range(s) of selected parameter(s).
Optional Analog Output	One 0-20 or 4-20 mAdc, 750 ohms max., isolated from inputs, ground, and each other. Independently field-assignable to any parameters and ranges.
Control Loop/Outputs (Optional)	Control Loops: 2 standard (one for each PV); current, pulse frequency, or time proportional Control Loop Types: PID, Duplex, On/Off Auto-tuning: Accutune II, fuzzy logic overshoot suppression, applicable to both control loops
Standard Alarm/ Control Relays	Two SPDT (Form “C”) Relays Resistive Load Rating: 4A, 120/240 Vac
Optional Additional Alarm/Control Relays	Two SPDT (Form “C”) Relays Resistive Load Rating: 4A, 120/240 Vac
Alarm/Control Settings	Alarm/on-off control delay: 0-100 seconds. Alarm/on-off control deadbands: individually set, from 1 count to full scale for pH, ORP, and temperature. On/off cycle period: 0 to 1000 seconds. On/off percent “on” time: 0 to 100%, 1% resolution. Setpoint and proportional band limit ranges: ±19.99 pH, ±1999 mV, -10 to 130°C, 1 count resolution. DAT cycle period: 1 to 1999 seconds. PFT maximum frequency: 1 to 200 pulses/minute. PFT pulse width: 50 ms, compatible with electronic pulse-type metering pumps.
Remote Preamplifier Input Option	Optional input card to accept input signal from Honeywell digital preamplifiers: Meridian II – 31075707 and 31022283 Durafet – 31079288 and Cap Adapter cables
pH Temperature Compensation	Conventional compensation for changing electrode output (Nernst response), plus selectable solution temperature compensation for high-purity water.
Calculated pH from Differential Conductivity	User selectable when unit has two Conductivity inputs. Used when ammonia or aminea is the water treatment chemical.

UDA2182 Dual Input Analyzer	
Auto Buffer Recognition (pH)	User Selectable Available Buffer Series: NIST, US, and Euro
Conductivity Compensations	NaCl, HCl, H2SO4, PO4, NaOH, NH3, Morpholine, Pure Water, Custom (User Selectable)
Dissolved Oxygen Measurement	Max flowrate (probe): 950 ml/min with flow chamber; no dependence on stirring or flowrate Atmospheric pressure: 500-800 mm Hg with internal sensor, for calibration Calibration with either Air or Sample
Auto Clean/ Auto Cal Function	Real time clock is used to set-up cycles to initiate a cleaning and calibration sequence. Cycle Set-up is user configurable.
Event History Screen	Event history screen stores 256 events with a description of the event and a Date/time stamp.
Calibration History Screen	Calibration history screen stores information on 128 calibration events with a date/time stamp.
Power Requirements	90 -264 Vac, 47-63 Hz, 15 VA . Memory retained by E^2PROM when power is off.
Wireless Interface	Type: Infrared (IR) Length of Link: 0 –1 M, 0 –15° Offset Baud Rate: 9600 Data Format: Modbus Protocol
RS422/RS485 Modbus RTU Slave Communications Interface (Optional)	*Baud Rate*: 2400, 4800, 9600, 19200, 38400, 57600, or 115200 selectable *Data Format:*: IEEE floating point and 32-bit integer. Word-Swap configurable. *Length of Link*: 2000 ft (600 m) max. with Belden 9271 Twinax Cable and 120 ohm termination resistors 4000 ft (1200 m) max. with Belden 8227 Twinax Cable and 100 ohm termination resistors *Link Characteristics:* Two-wire (half-duplex), multi-drop Modbus RTU protocol, 15 drops maximum or up to 31 drops for shorter link length. Modbus RTU slave: Provides monitoring of inputs outputs, statuses, alarms, and variables. Provides writing of variables for remotely modifying parameter settings
Ethernet TCP/IP Communications Interface (Optional)	*Type:* 10 or 100 BaseT; auto-speed and auto-polarity sensing *Length of Link*: 330 ft. (100 m) maximum. Use Shielded twisted-pair, Category 5 (STP CAT5) Ethernet cable. *Link Characteristics*: Four-wire plus shield, single drop, five hops maximum *IP Address*: IP Address is 192.168.1.254 as shipped from the factory *Recommended network configuration*: Use Switch rather than Hub in order to maximize UDA Ethernet performance *Configuration*: Ethernet parameters are configured via the front-panel or web pages. *Modbus TCP/IP*: Five simultaneous socket connections provide monitoring of inputs outputs, statuses, alarms, and variables. Provides writing of variables for remotely modifying parameter settings. *Modbus TCP/IP Data Format*: IEEE floating point and 32-bit integer. Word Swap configurable. *Web server*: multiple client support *Web pages*: monitoring inputs, outputs, statuses, alarms, and events *Multi-language Email*: Alarm notification to eight email addresses. These must be configured using web pages signed in as the administrator. *DHCP:* (Dynamic Host Configuration Protocol) selectable via web page or front-panel
Safety Compliance	UL/CSA General Purpose FM Approval for Class I, Div 2.
CE Compliance	CE Conformity (Europe): CE Mark on all models signifies compliance to EMC Directive

UDA2182 Dual Input Analyzer	
	84/336/EEC and LVD Directive 73/23/EEC. EMC Classification: Group 1, Class A, ISM Equipment Method of Assessment: Technical File; EN61326, EN61010-1 Declaration of Conformity: 51453667
Installation Rating	Installation Category (Overvoltage Category): Category II Pollution Degree 2 Altitude: 2000 m
Case Dimensions	156 mm X 156 mm X 150 mm (6.14” X 6.14” X 5.91”) Panel cutout: 138.5 mm X 138.5 mm (5.45” X 5.45”) Panel thickness: 1.52 mm (0.06”) min, 9.5 mm (0.38”) max
Enclosure rating	CSA Type 4X (NEMA 4X)
Weight	Approx 3 lbs (6.6kg)
Mounting	Panel mounting-hardware supplied. Optional Wall and 1” to 2” pipe mounting. Select option appropriate in Model Number.

Dimensions

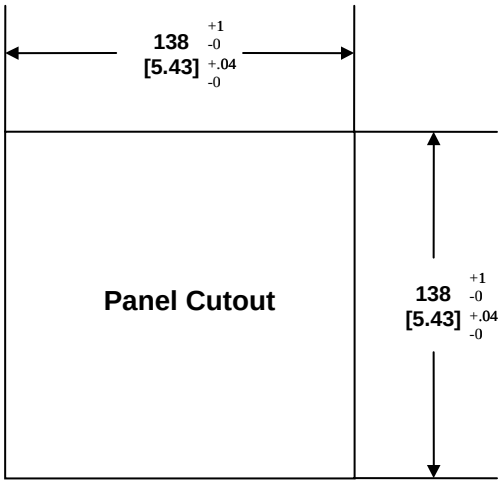
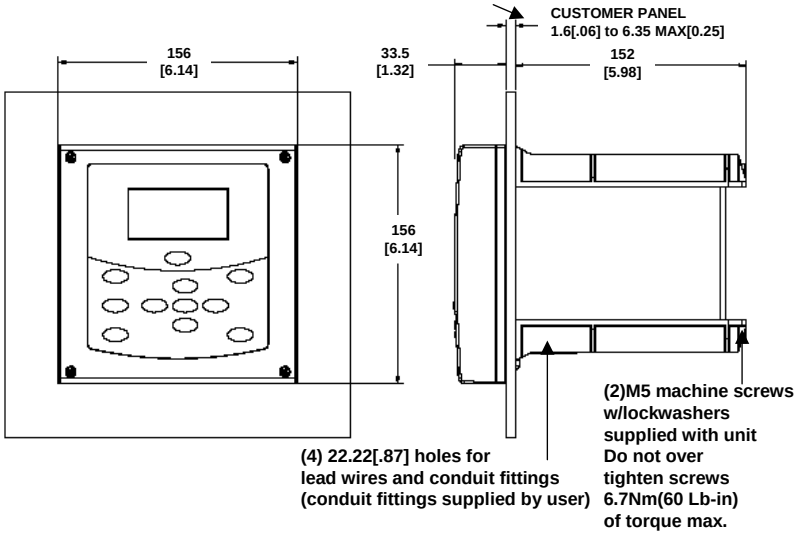


Figure 3 — Cutout and Panel Mount Dimensions



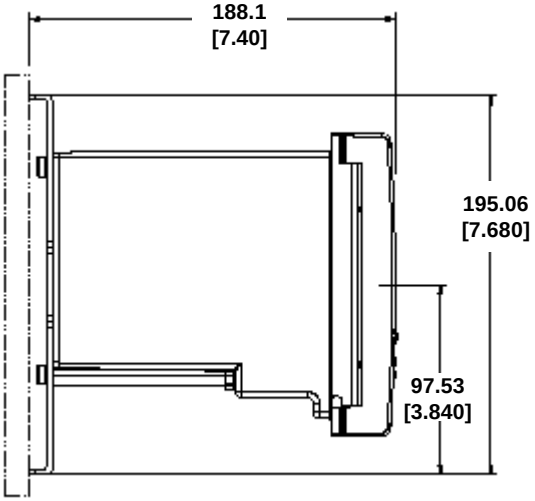


Figure 4 – Wall/Pipe Mounting Dimensions

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and **is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose**. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For More Information

Learn more about how Honeywell's UDA2182 Universal Dual Analyzer can offer more power, flexibility and performance, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

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Phoenix, Arizona 85027
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Honeywell

Durafet Cap Adapter Specifications

70-82-03-66 February 2010

Description

Durafet Cap Adapters are preamplifiers that are built into cables that connect the Durafet pH sensor to the pH Instrument. The preamplifier conditions the pH signal and allows for greater distances between the pH sensor and the pH Instrument. The preamplifier electronics are packaged in either a nickel plated brass (Durafet III) or a plastic (Durafet II) housing that is integral to the cable. There is no separate mounting of the preamplifier required. The Durafet Cap Adapter has a quick disconnect connector to easily connect the cable to the electrode and tinned leads that connect to the pH Instrument. Once the cable is connected to the pH Instrument there is no need to re-wire the cable to the instrument when electrodes are replaced.

Figure 1 - Durafet III Cap Adapter

Figure 2 – Durafet II Cap Adapter

Cap Adapter Specifications	
Part Numbers/ Cable Length	Durafet II 51205965-502 20 feet 51205965-505 50 feet Durafet III 51453388-501 20 feet 51453388-502 50 feet
Connector Type/Material	Durafet II PC Board/Ryton; EPDM o-rings Durafet III Vario Pin/Ni Plated Brass; Viton o-rings
Electronic Housing Material	Durafet II Ryton Durafet III Nickel Plated Brass
Approvals	FM Approved as Intrinsically Safe with Entity Parameters and Non-Incendive with non-incendive field wiring
Temp Rating	0 to 70° C (32° to 158° F)
IP Rating	IP68 (33 feet immersion for 1000 hrs)
Cable Material	PVC
Leads	8 Conductors plus Shield, 28 AWG
Power Required (supplied by Instrument)	+/- 5 to +/- 16 VDC
Current Rating	3.4 mA max @ 16 VDC

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is in **lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose**. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For More Information

Learn more about how Honeywell's Durafet Cap Adapter can be used to help measure, analyze and transmit pH and ORP information in industrial processes, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

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